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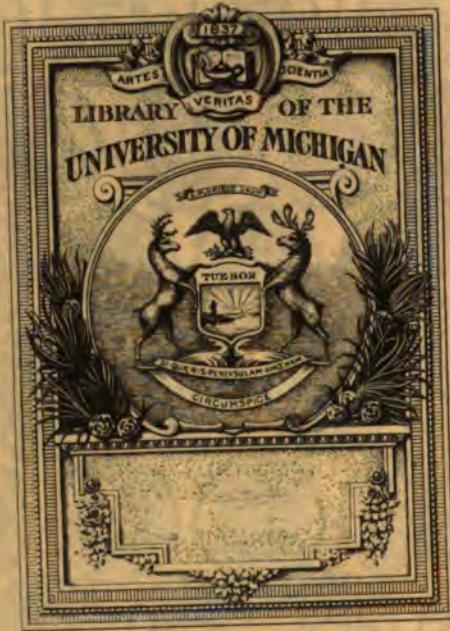
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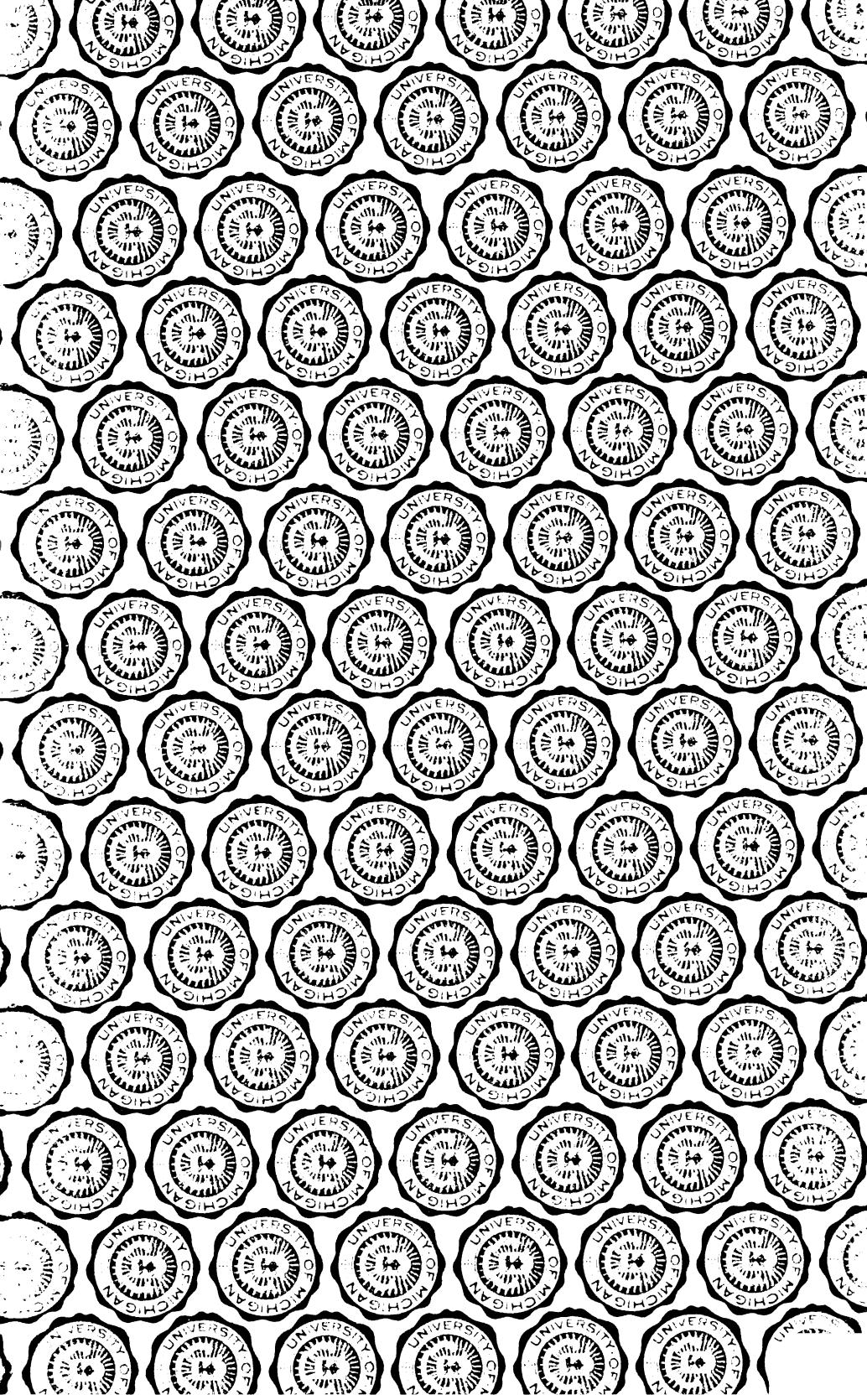
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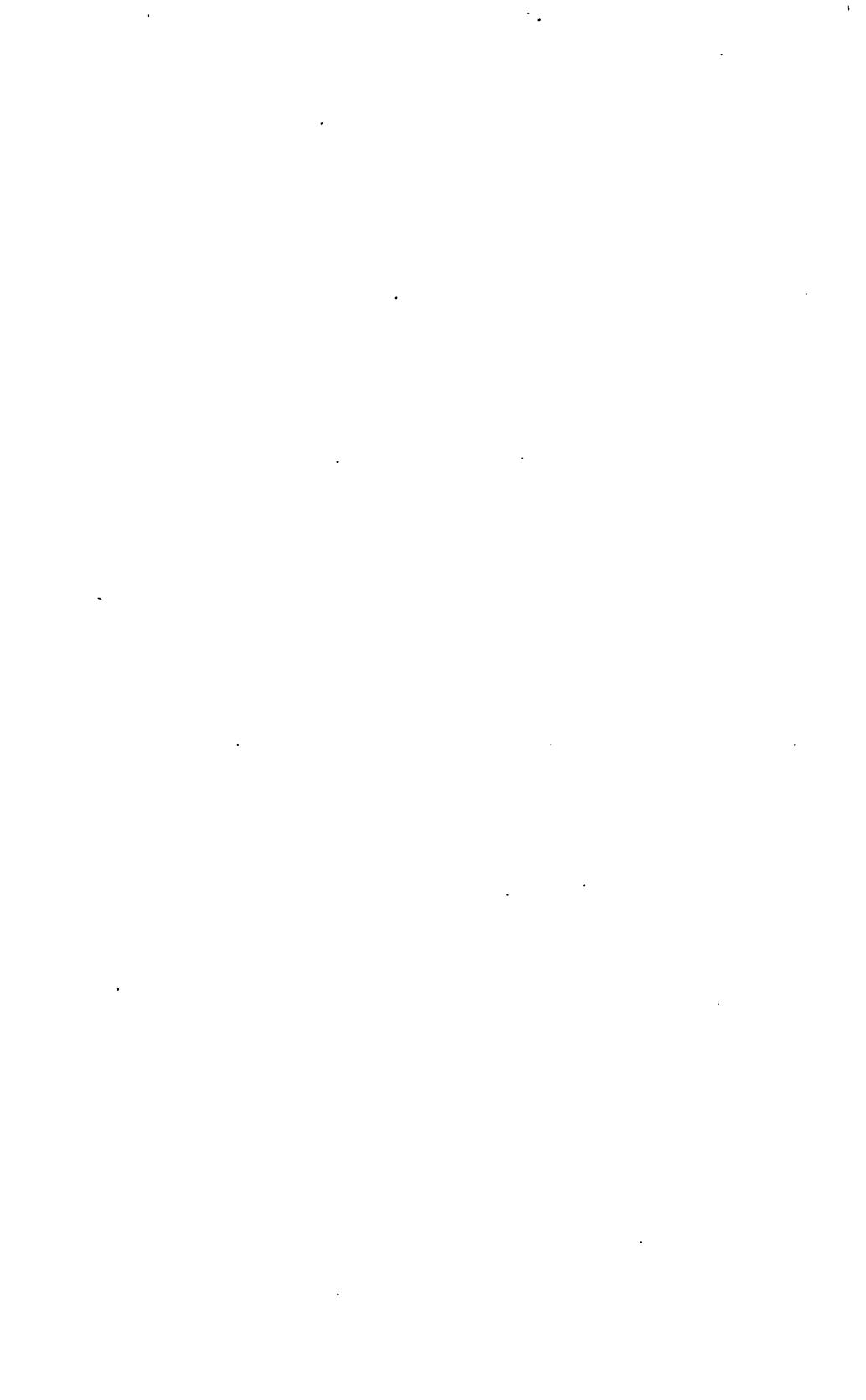
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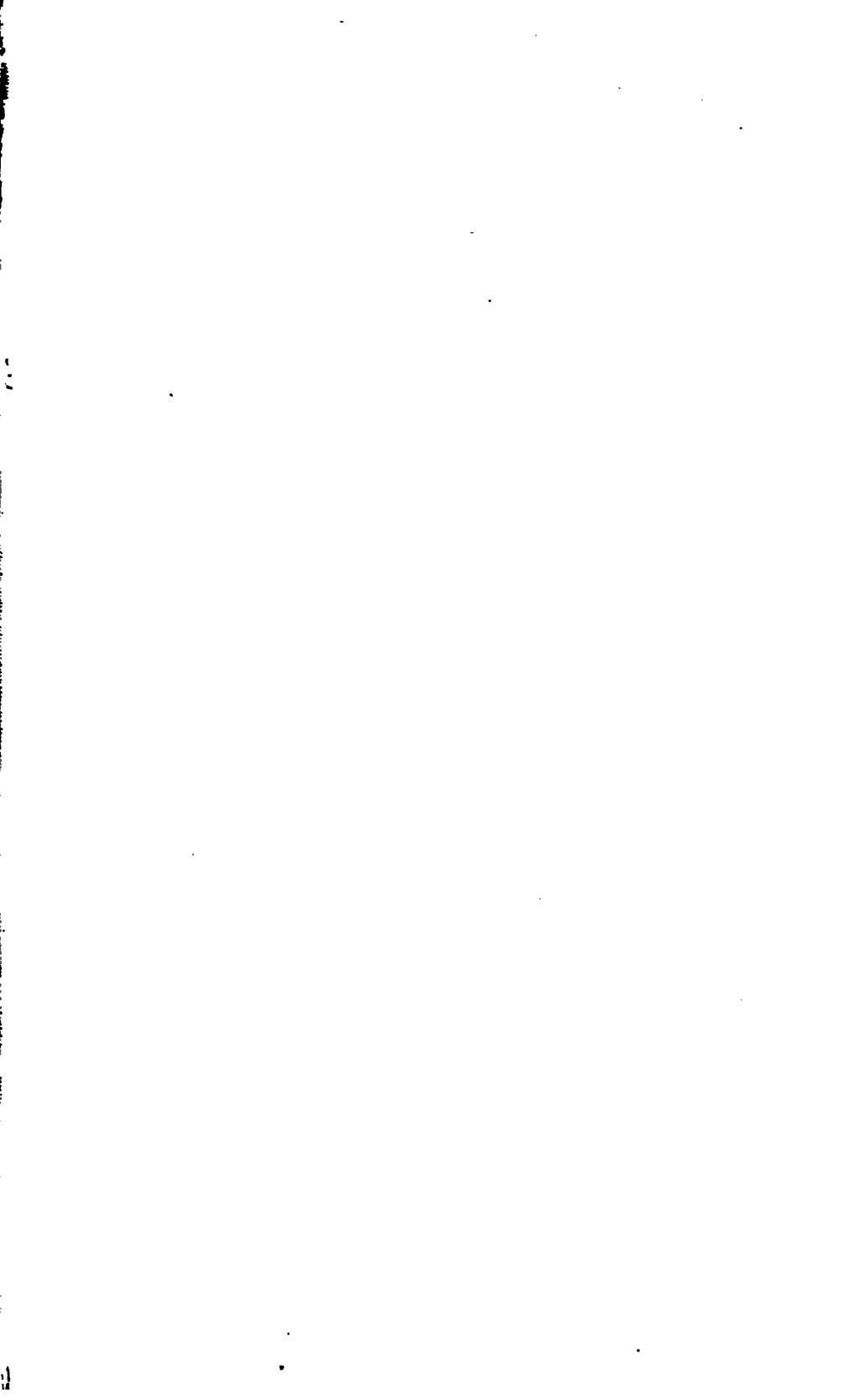
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THE AMERICAN BOTANIST

**A QUARTERLY JOURNAL OF ECONOMIC AND
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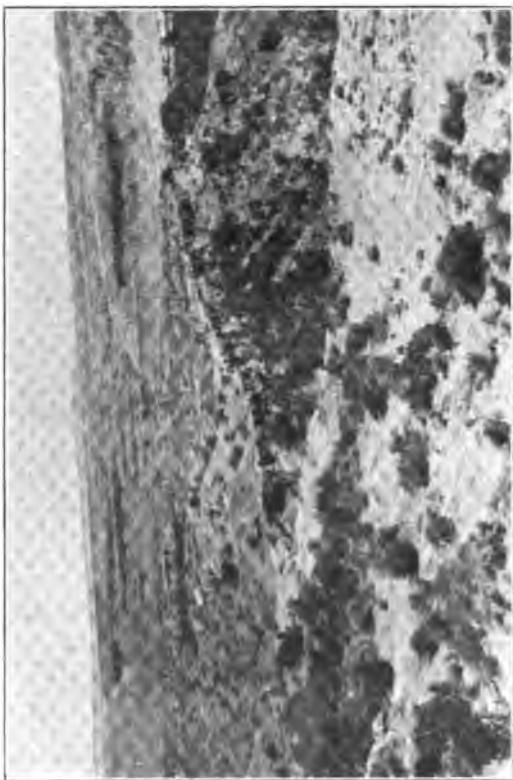
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PAINTED DESERT, LOOKING TOWARD MOENKOPI WASH.



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*When first the lone butterfly flits on the Wing,
When red glow the maples, so fresh and so pleasing,
O then comes the bluebird, the herald of spring,
And hails with his warblings the charms of the season.*

—Alexander Wilson

BOTANIZING IN THE PAINTED DESERT

By WILLARD N. CLUTE.

ARIZONA, the sixth largest State in the Union, consists almost entirely of desert lands. Of its more than 72,000,000 acres, only about one tenth is cultivated. The name Arizona, appropriately enough, is often assumed to have reference to the "arid zone" in which the State is situated, but this derivation is incorrect. The name really comes from an Indian word "Arizonaca" said to mean a place of small springs. This, however, is only another way of putting it. The springs are certainly small and exceedingly far apart.

The southern part of the State has many good examples of the true cactus desert, but in the northern part the scanty vegetation is of quite a different type being characterized by numerous small-leaved shrubs and herbs with only a scattering of cacti. It is this latter type of desert that prevails in the broad valley occupied by the Little Colorado and its tributaries in the northern tier of counties which, owing to the multicolored cliffs and canyons that are here in evidence, has come to be known as the Painted Desert.

Nearly a hundred miles northeast of Flagstaff, in the midst of this waterless expanse of drifting sands, stony plains, and lava outcrops, lies the oasis of Tuba. It is the one verdant spot in the wilderness and its flora, quite unlike that of

the surrounding region, is one of considerable interest. In the early summer of 1919, we camped at Tuba for a few days on our way to the great Natural Bridge over beyond Navajo Mountain and observed some of the interesting features of the flora. When the opportunity to make a closer acquaintance with it was offered in 1920, I quickly took advantage of it and spent about a month in the region during which time practically a complete collection of the plants was made. Kayenta, some seventy-five miles northeast of Tuba, was again visited by way of Red Lake and a trip was also made to the cliff dwellings in Laguna Canyon, all of which resulted in adding additional specimens to my list.

One could scarcely imagine a more remote and isolated situation for human habitations than Tuba. Accessible to civilization by a single indifferent road, connected with the few and distant trading posts by mere trails, and surrounded by a scattered population of Hopi and Navajo Indians, it presents a phase of existence which, if somewhat retired, is not without its attractions. Mocking birds sing in the spiry poplars that line the single street, doves coo in the orchards of apple, pear, peach and apricot, humming-birds glide from flower to flower, and the splash and gurgle of water in the irrigation ditches is an ever-pleasant sound. Fed by the cool clear water that here comes to the surface in a number of springs, the vegetation possesses a luxuriance quite in contrast to that of the adjacent region. Only a few feet beyond the influence of the water, the hot, dull-red sands, thinly scattered with greasewood, rabbit-brush yucca and joint fir, stretch away to the horizon in grim and lifeless silence. But on the hottest days, when the temperature of the desert may run well above a hundred, one can always find coolness in the shade of the poplars.

The occurrence of this water in the midst of the desert

was doubtless known to the aborigines from the earliest times. Probably the region was inhabited by the cliff dwellers or their contemporaries and these were followed later, by the Hopi Indians, and still later by the Navajos. Nearly four hundred years ago, the first Spanish explorers found the Hopi here and he still clings to the locality with ways very little changed through his contact with the Whites. The Hopi are pueblo indians and their village, Moenkopi, is located on a slope overlooking a Wash by the same name, about three miles from Tuba. The Navajo is more a lover of solitude and his hut of mud and brush, scarcely superior in finish to that of the muskrat, is found here and there in the driest and most desolate spots.

The first white settlers entered the region about 1878. They were Mormons, and with their usual industry they began planting orchards and shade trees, constructing irrigating ditches and reservoirs and establishing a successful agriculture. Twenty-five years later their holdings were taken over by the United States Government and the place has since been the center of the Western Navajo Indian Agency. Evidences of Mormon occupation about many moist places no longer cultivated are still to be seen and the irrigating system now in use follows in general, the lines laid down by them. Tuba City, so called, to distinguish it from a town of similar name in the southern part of the State, consists of about a dozen houses of adobe and stone, clustering about the hospital, school and administration buildings of the Agency.

Less than a hundred acres are cultivated in the oasis proper, but a much larger acreage is cropped in the Moenkopi Wash a few miles further south, and the area is apparently capable of still greater extension. There is always running water in the Wash, the chief supply coming, as in the oasis, from numerous springs and seeps. A large part of this runs

down from Reservoir Canyon a few miles to the east traversing on the was a cat-tail swamp. At one point a low dam forms a small lake, in the swampy borders of which the wild ducks nest. Much of this water is used by the Hopi in his irrigation projects and the rest renders fertile the government farm further west. Much of the flood waters from the Black Mesa, fifty miles or more northeast, also runs off through the Wash. Owing to the rocky surface of the country, very little of the rainfall is retained and some hours or days after a storm on the distant heights, a dark and turbid torrent, more like liquid mud than water, pours through the valley, often tearing out dams, silting up reservoirs and irrigating ditches, cutting new channels, and causing much other damage.

The highest recorded temperature at Tuba is 108°F. in August and the lowest 13°F. in December. Much of the year, therefore, is favorable to plant growth, but the lack of water reduces the vegetation to the minimum. As in all the surrounding region, there is a marked difference between the day and night temperatures. Owing to the dry air, cooling after sundown is very rapid and the air may become decidedly chilly before morning, even in summer.

The precipitation in the Oasis is insufficient for dry farming. It is seldom more than six inches a year and a great deal of this falls as snow during the resting season. Under irrigation, however, the soil yields good crops of corn, wheat, cotton, alfalfa, melons and all the common garden crops. The precipitation, moreover, is distinctly seasonal. From the last of March to the middle of July—the season of greatest bloom elsewhere—little, if any, rain falls. In 1920 there was no precipitation whatever in April, May and June. This uneven rainfall has an important effect on the vegetation. Upon the breaking up of winter, there is sufficient moisture for flowering and most of the desert plants burst into bloom. Then en-

sues the dry period during which the plants sink into a sort of æstivation and the vegetated areas assume a characteristic gray-green hue. In late July the rains begin again and a second spring soon sets in with a profusion of flowers scarcely second to that of the earlier season. A number of plants bloom only once, but others bloom twice a year and at the time of my visit were found with both flowers and mature fruits.

A collector in the desert, especially if it be as remote from civilization as this one, cannot fail to have a variety of interesting experiences. He soon discovers, for one thing, that although the air is very dry it does not follow that the drying of plants will be an easy matter. Water plants, to be sure, are ready to remove from the driers at the end of twenty-four hours, but the true desert plants have profited by their long experience with a scanty rainfall and hold on to their moisture with a baffling persistence. It required nearly a month to induce some to even approach dessication.

In this region the character of the plant population depends in large measure on the character of the soil. In general, sandy or adobe soils tend to have a more luxuriant flora than do stony areas. For much of the distance between Flagstaff and Tuba, especially in the vicinity of the Little Colorado river, the region is absolutely bare of vegetation. When plant growth of any kind is possible, an eriogonum (*E. divaricatum*) and two saltbushes (*Atriplex saccharia* and *A. Jonesii*) are scattered over the hot soil. The eriogonum appears to be the very last thing to give up the struggle with heat and drouth. One of the surprises of this section is to find a yellow-flowered milkweed, (*Asclepias obtusa*) growing singly in situations where the temperature must daily reach 150° F. or more.

In less inhospitable situations, the ordinary inhabitants of the desert push in, but seldom in numbers large enough to entirely cover the soil. Even the most fertile spots have a tuf-

ted appearance, owing to the tendency of all the plants to take on hemispherical forms. In all but the driest locations the greasewood (*Sarcobatus vermiculatus*) is the dominant shrub, its fat cylindrical leaves strung along the branches suggesting the fronds of ferns. Other conspicuous shrubs are the big rabbit-brush (*Chrysothamnus graveolens*) and various species of shadscale (*Atriplex*). Interspersed with these usually grows the low rabbit-brush (*Chrysothamnus filifolius*); in fact, the round, yellow-green clumps of this plant are so abundant over thousands of square miles hereabouts as to become exceedingly tiresome to the eye. Scarcely less abundant is the rayless goldenrod (*Isocoma heterophylla*) which forms similar, though larger, hemispheres of green.

With the exception of several species of *Opuntia*, cacti are rare. A narrow-leaved yucca is abundant and also the joint fir or Mormon tea (*Ephedra viridis*). Here and there the dry and shifting surface of the sand dunes were splashed with vivid green where the Russian thistle (*Salsola pestifer*) has established itself. The plant is reported to have entered the region about 1890 but it now has all the appearances of a native. It produces immense rounded clumps, often four feet or more across. Sheep and goats eat the young plants with avidity and even the yuccas and joint firs do not entirely escape.

Trees of any kind are, of course, rare in the desert, but as one climbs to elevations of a mile or more above sea-level, the one-seeded juniper (*Juniperus monosperma*) and the pinon pine (*Pinus monophylla*), begin to appear and with them the sage-brush (*Artemisia tridentata*). This latter plant, so abundant in many localities, is almost entirely absent from the vicinity of Tuba.

One does not study the vegetation long before discovering that three floras meet in this region. There is first the

flora of the desert proper, which extends for hundreds of miles in every direction, then there is the hydrophytic flora about the springs, seeps, and reservoirs, and last and most interesting, the flora of the cultivated lands in the oasis. The wet grounds often of very limited extent, are the only places in the desert that appear reasonably full of plants. Here, one might imagine, competition of one species with another is possible; elsewhere, the struggle is not that of plant with plant, but rather that of the plant with the hard conditions of climate and soil. It is well known that the water plants are very much alike the world over and this region is no exception to the rule. It is difficult to say which particular species is most abundant, but the most conspicuous is most certainly the common cat-tail (*Typha latifolia*) which might be said to occur wherever there is moisture. The great bullrush (*Scirpus occidentalis*) is nearly always found with the cat-tail and the two often grow to a height seldom equalled elsewhere. Along the water-courses, the reed-grass (*Phragmites arundinacea*) forms thickets while the marshy places are well occupied by an umbellifer, *Berula erecta*, and various species of *Juncus*. I did not see a carex of any kind in my explorations. The common water-cress, however, fairly chokes up the small water-courses.

Neither the desert nor the wet grounds are lacking in flowers, but they possess few species that can compare in conspicuously with the globe mallows (*Sphaeralcea*), the painted cup (*Castilleja lineariaefolia*), desert trumpet flower (*Datura meteloides*), the evening primrose (*Oenothera sp?*), crownbeard (*Ximenesia encelioides*), the desert thistle (*Cirsium calcarea*) and many others. Along a small irrigation ditch that runs through the orchard at Tuba, I found one of the showiest of the milkweeds, *Asclepias speciosa*, with large pink blossoms like 5-pointed stars and near by, a large yellow evening primrose that may be new to science.

A complete list of the plants collected, with notes on their interesting features will be printed at another time. I cannot close this narrative, however, without some acknowledgement of the many kindnesses from those with whom I came in contact and which added much to the pleasure of my trip. I am especially indebted to Mr. Julius Buckbee of Kayenta, Mr. W. S. Beard of Flagstaff, Mr. Keirn, teacher at Moenkopi, and Messrs. Cook and Curley, Indian traders at Tuba, for aid and information. Last, but by no means least, my thanks are due to Supt. Robert Burris and his capable assistants at the Western Navajo Indian Agency. I shall long remember the evening gatherings at which much was done to entertain the stranger within their gates.

CONTRIBUTIONS OF THE PLANT BREEDER TO THE VEGETABLE GARDEN

By LUCILE MARSHALL, M. A.

"**I**NCREASE production of foodstuffs," is the great cry which is heard by farmers everywhere. It has been said there are three foundations on which rest the increased productiveness of crops and animals: the enrichment of the land; the tillage and care; and the producing of better varieties and strains. It is high time that growers give their full attention to the third of these. The experiment stations are leading the way by conducting experiments which deal with the fundamental problems of the locality. The results are helpful and constructive. Too often growers do not realize the practicability of the deductions with reference to their own problems. This seems true in the case of vegetable gardeners. So

much has been done for the improvement of field crops that the improvement of vegetable seeds has been almost lost sight of. A surprising number of books and pamphlets on vegetable gardening do not even mention the subject of plant breeding in connection with vegetable growing in even a general way.

Technically, "seed-breeding may be considered from at least two very distinct viewpoints; first, the origination and development of new improved varieties, either through selection or cross-breeding; and second, the development and raising of truer, purer stocks or strains of proved value." This second branch of seed-breeding is of permanent and economic interest in our present emergency of scarcity of food-stuffs throughout the world. Associations have been formed in a number of states to encourage the farmer to demand better seeds, and the seedsmen to produce them. Notable examples of such work are the associations of Wisconsin (*Wisconsin Agricultural Improvement Association, and the Wisconsin Potato Growers Association*); Minnesota, (*Minnesota Field Crop Breeders Association*), Ohio; New York; Illinois, (*The Illinois Seed-Corn Breeders Association*.) Let us consider in detail what the plant and seed breeders have done for the improvement of vegetable seeds, and in this way discover other practical means of increasing production, taking the kinds of vegetables discussed by Professor Watts in his book on Vegetable Gardening in alphabetical order.

"The artichoke has been so little worked that it offers good opportunities for the amateur, either through cross-breeding or merely through selection. Plants grown from the seed are sure to show a certain range of variation, and you may readily develop improved varieties by selecting seeds from the best and repeating selection through two or three successive generations." Such is the opinion of Luther Burbank. By selective breeding after crossing several varieties

of the European artichoke (*Cynara Scolymus*) he has developed the flower heads so that they are more than twenty-four inches in circumference when open. The artichoke is one of our few perennial vegetables, so gardeners can propagate from suckers and production can be increased by individual plants if the grower finds it desirable.

In asparagus we have a perennial vegetable which does not produce its best seed until after it is four years old. Professor Watts outlined a simple plan of selecting the most prolific plants, then the best berries on these plants, and also how to float off light inferior seed in the water test. Select one-year plants that look like smooth needles and bear in mind that male plants are more prolific than female. Experiments at the Ohio Station show a gain of the male over the female plants of 76% for the first period of cutting. The New Jersey Experiment Station has just issued a bulletin on "Asparagus Culture in New Jersey." It would be well for any grower to use varieties recommended in this bulletin if he does not wish to start his own plantation.

George Perry writes in the January 1919 Market Growers Journal, "There has been a great improvement in beans during the last fifty years. Still, the seedsmen list and sell, (*because they are called for*), the sorts that were the best to be had fifty years ago. At that time the Long Yellow was the only string bean known, and, though tough and stringy, it is yet found in every catalog in the land. With the advent of the Stringless Green Pod, that variety in turn took the lead. In the shell beans there has been no such advance, as the Horticultural still holds the leading place. Bailey & Gilbert say, "Perhaps there are no plants more tractable in the hands of the plant-breeder than the garden beans." They tell of two seedsmen who wanted certain kinds of new beans and went to plant breeders to get them, just as one would order a piece of

furniture made to order. Beans are prolific in yield so the problem is only to increase consumption by producing more palatable and attractive varieties. "Henderson and Kumerle Dwarf Limas were introduced in 1889, Burpee in 1890, and Barteldes in 1892 or 1893....and Burpee Bush Lima was presented to the public in the spring of 1890." Henry Schnell of Missouri grew a Tree Bean which he describes as growing "2½ feet high, and was really a small tree. It was very productive and matured early."

Bean-breeders' have discovered a number of things that may be helpful to men who grow their own seed. For example, beans with fleshy pods succeed best on rich clay soils. The kidney wax on rich black soil. Soil and climate modify the character as to size and smoothness of leaves and fleshiness of pods. The breeders find that better seed beans are grown by light seeding. The plants are sensitive to excessive moisture or drought. Lima and pole beans seed well, grown along the California coast.

By the method of Vilmorin it is well known that plant-breeders have increased the sugar content of beets by continual selection. Also, varieties have been developed which mature in two months, instead of five. This makes increased production possible in the number of crops per season. Tracey points out that purer strains of stock of proved value should be raised. By a trial planting it was found that "practically every root grown from 2-rod plantings of each of 214 samples of seed purchased under distinct varietal names from the most reputable seedsmen of America and Europe could be grouped into not over twenty distinct forms, and the roots so thrown together show as little variation as the crop from any one of the twenty most uniform samples in the trial. Often the only difference between two lots sold under dif-

ferent names would be in the proportion of the roots of each lot that conformed to the same varietal form."

Of the Cole Crops, Cabbage is of the greatest economic importance. Breeders have produced different shaped heads—round or ball, egg-shaped, oval, flat and conical. The modification of the cabbage leaf has given us kale, collard and borecale. The modification of the stem has produced kohlrabi and Brussels sprouts. Variation in the flower and consequent careful selection produced the cauliflower. All of these originated from the wild *Brassica oleracea*. Plant-breeders at Wisconsin Experiment Station have developed the Wisconsin Hollander strain which is practically immune to Cabbage yellows. Southern-grown "frost-proof" has been proven of little value. At the Ninth Annual Meeting of the New York State Vegetable Growers Association, Mr. E. N. Reed told of a fine strain of Danish Ballhead Cabbage which has given 20 tons to the acre for the last ten years. Chinese Cabbage or Celery Cabbage is becoming more popular and it is a good heavy cabbage, weighing from three to five pounds. H. S. Lee of Kane County, Illinois, says he can get 98 heads out of 100 plants set out.

Herbert Starkey, President of the Pennsylvania Vegetable Growers Association, raised carrots from home-saved Danver's seed. The yields were from 500 to 700 bushels per acre. In New York, Oxheart has proved a heavy yielder—2 pounds per foot of row. Varieties have been discovered by breeders which are resistant to the Carrot rust fly (*Psila rosae*).

Self-blanching celery is directly the result of breeding and selection. It did not appear until 1884. It has revolutionized commercial celery culture. Interesting varieties have developed with which the grower should acquaint himself, choosing the seed best adapted to his need. In this way pro-

duction can be increased with a minimum amount of effort.

Chard or Swiss chard has been worked with and the varieties successful for blanching have been developed. Canners in Oregon are experimenting with a chard from which 4½ to 5 pounds can be picked at a time from one plant. Strains of chickory have been bred by means of selection which make greater production necessary to fill all the possibilities. There is Witloof Chicory or French Endive for blanching or salad purposes. There is the Large Coffee-Rooted and then the Gregory, etc., for "greens."

American breeders of cucumber seed have done much to increase the yield of cucumbers. For this purpose English and American types have been crossed, giving a type combining the good points of both. The variety Abundance is an example of this cross-pollination. Under glass and with intensive cultivation one can produce 36 dozen cucumbers to 100 square feet. In the west this is increased to 46 dozen to 100 square feet.

Burbank and others have experimented with the common dandelion and, by selection, the American Improved, Large, and the Thick-leaved French varieties have been bred. These varieties are much more palatable than the wild and may be blanched to increase their good qualities. Bailey worked with eggplant unsuccessfully. Self-pollinated seeds gave variable offspring and none reproduced the parent. Eggplants present a complex breeding problem because there is surface color and flesh color both to consider. The Department of Vegetable Gardening at Cornell was successful in grafting tomato scion on eggplant stock in 1915, but nothing extraordinary happened. The tomato bore its fruit serenely and the eggplant flowered but bore no fruit. The tomato plants were stolen when immature.

Endive is a native of East India. It endures summer

heat well. Four commercial varieties are offered by Burpee. Growers should raise more of this as a late summer lettuce substitute. Expert growers like Peter Henderson have increased the yield of horse-radish from two to five tons per acre. The production of lettuce is increased by commercial growers who aim to have each plant as heavy as possible. Plant-breeders used two varieties for crossing—Grand Rapids and Golden Queen. A new loose type was developed for the west and a new head type was secured, better fitted for eastern conditions. The length of time needed from planting to maturity has been decreased. Now a spring crop will mature in seven to eight weeks, and a fall crop in twelve to fourteen. An acre planted in the best seed should produce 30,000 heads. The heavy producing Grand Rapids was produced by selection on the Black Seeded Simpson.

Productiveness in muskmelons depends largely on properly selected seed. The Indiana Experiment Station suggests the ideal type for breeders of the Netted Gem. Professor Watts says that the best fruit does not necessarily produce the best seed, but the entire plant with its product must be considered the unit.

The yield of the onion varies from 300 to 1000 bushels per acre. Selected seed is bound to increase the yield. Breeders have found it best to select bulbs for seed at harvest. According to Professor Watts "they should be of the desired size and form. A short neck is considered an advantage. Uniformity in all of the essential characteristics is exceedingly important in choosing bulbs for seed purposes. Seed bulbs should be stored and planted as nearly as possible in the spring." There are many varieties of onions and this makes possible an adaptation of the variety to soil and climate, which will of course increase crop production.

The Royal Horticultural Society's Journal for 1909 des-

cribes thirty-seven varieties of parsley. This shows that seed breeding might be better developed in the United States. The English have cultivated parsley since the reign of Edward VI. Consumption is increased by production of attractive varieties, and production is increased by varieties suitable to different environments.

Peas are more liable to cross than beans. Peas to be used for seed should be grown in an isolated spot. Uniformity in habit of growth is important. Mendel showed by hybridizing peas that there is a numerical ratio in given characteristics of cross-bred offspring. This law has been invaluable in all breeding work ever since. Mendel's law shows further that hereditary characteristics are usually independent units which segregate out upon crossing, regardless of temporary dominance.

Of Peppers, Professor Watts says: "Seeds should be selected with the greatest care. Some successful growers produce their own seeds and maintain superior strains. To prevent the development of the pungent character in sweet peppers there must be no cross-polination with hot-fruited varieties."

Varieties of radish show a wide range and those adapted for special purposes should be selected. Carriere produced radishes from the wild slender-rooted charlock (*Raphanus Raphanistrum*.) In forcing radishes great improvements have been made. Burpee has a variety called Rapid Red which will mature in 18 days under glass. Ten to twelve radishes can be raised per foot. The grower counts on getting four crops from October tenth to April fifteenth. Fourteen bunches—six to eight to a bunch—can be calculated upon from one square foot.

In the case of rhubarb seed only 15 to 20% of the seeds come true to name. Root cuttings or division of the clumps

are more reliable methods of propagation. Interesting bud variations are always possible with perennial vegetables. In forcing rhubarb the petiole is longer, the texture is improved, the epidermis is thinner, and the water content is increased.

In English catalogs three varieties of sage are offered—green and purple, which are hardy, and a variegated form which is not. Dreer offers Holt's Mammoth Sage, but this does not produce seed and must be propagated by cuttings. Thorburn lists a Broad-leaf Sage, Red Sage and Purple Sage. Boddington lists three varieties—Common, Red, and Purple. It behooves growers to watch progressive seedsmen in their attempts to produce new varieties which are adapted to different climates. A plant in harmony with its environment will naturally make the best and quickest growth.

The Rhode Island Experiment Station in Bulletin 41 has divided the varieties of Spinach into four groups, each with characteristics clearly defined, so that growers may benefit by the distinctions, and plant to get the greatest yield possible for his given conditions.

Both the Maine and Maryland Experiment Stations have done considerable work on sweet corn, and their bulletins describe different varieties and their particular value. It has been found that cross pollination may take place at a distance of two miles. Black-birds carry pollen in their plumage. Varietal difference in time of maturity does not prevent cross pollination of corn. However, there is loss of vegetative vigor in plants which are persistently self-pollinated. Better stock seed corn should be used. Locally grown seed of good reputation is best to use in that locality. In the west the corn develops faster. Rich, mucky soil gives better field corn, while the gravelly soils give better returns in quality of sweet corn. Climatic conditions govern size of stalk and earliness. Soil conditions govern sweetness and tenderness.

The experiment stations have not been able to show that it is profitable to use large tubers of sweet potato for seed. A great deal of work has been done on sweet potatoes by experiment stations in both the North and South. Plant dealers know that some varieties have very much greater power to reproduce than others, and they charge accordingly for tubers which are to be used as seed.

New varieties of tomato are being discovered each year. Yields vary from 100 to 800 bushels per acre in the field. Great advances have been made in raising tomatoes under glass. It has been found that the English varieties are best for winter use and the American type for large spring fruits. The English variety Comet, which is small and adapted to dark weather, will produce 5 to 6 pounds per plant. The Peerless—an American variety—will produce 11 to 12 pounds of fruit per vine.

Plant Breeders have done a great deal to increase the production of field crops but there is eight times as much profit in vegetable growing as there is in general farming, according to census reports. Therefore it behooves the growers to make the breeders work for them, to help increase production. The greenhouse crops show the results of intensive study by breeders, and a like improvement is possible with all the vegetables. It is of great economic importance to make use of every bit of information gained by scientists which will help increase production. The grower himself will gain, and the world demands this efficiency in production which will increase the supply of food-stuffs.

PLANT NAMES AND THEIR MEANINGS--V

LILIACEAE—I

By WILLARD N. CLUTE.

In nearly every large plant family may be found one or more lesser groups in which the species possess a certain likeness of their own and resemble one another more closely than they do the members of the family as a whole. Conservative botanists usually regard these as separate sections of a single family, but others, less hampered by precedent, make distinct families of each group. Since such segregation does not affect the nomenclature of genus and species, it is perhaps, less objectionable than certain other practices of the systematist. There is no hard and fast line for separating plant families, and the matter may well be one of individual preference. In the case of the Liliaceae or lilyworts, however, if we were to follow the example of the more radical we would split off from it the Convallariaceae or Lily-of-the-Valley Family, the Smilaceae or Smilax Family, the Trilliaceae or Trillium Family, and the Melanthaceae or Bunch-flower Family. Of these groups the Trilliums and Smilaxes are usually retained in the Liliaceae but there is more reason for separating the others, and in any event, they all belong to the Liliales.

The typical forms that all botanists regard as belonging to the Liliaceae, are, of course, the lilies of the genus *Lilium*. The generic name is the Latin form of the Greek *Lirion* meaning a lily and is said to come from the "Celtic" *li* meaning white. It may perhaps be doubted if the "Celtic" has anything to do with the name and the suggestion may be merely

another white li. The Name of *Erythronium*, given to another group of plants much like true lilies, is also from the Greek. *Erythros* means "red," and the name is said to have originally been applied to some species with flowers of this color. Still another lily-like group is found in the genus *Hemerocallis* which comes from two Greek words meaning "beautiful for a day," in reference to the evanescent character of the flowers. *Funkia*, the name by which other day lilies are called, is for Henry Funk, a German cryptogamic botanist.

The checkered perianths of some species of *Fritellaria* have suggested the generic name from *fritellus* signifying a chess-board. *Camassia* is an adaptation from the Indian camass or *quamash* by which name the aborigines knew the plant we call wild hyacinth. The name is often written *Quamassia*. The species are closely related to an Old World group to which the squills belongs and in early books may be found in the genus *Scilla*. *Yucca* is another aboriginal name, this time coming from Haiti. It is said to have been the original West Indian name for the cassava plant (*Manihot*) and to have been applied erroneously to our plant by Gerarde of "Herbal" fame. The genus *Tulipa* is said to come from the Persian *Thouliban*, signifying a turban, in allusion to the flowers. It is difficult to see how the suggestion applies, however.

Aletris, the generic name of a curious little plant known as colic-root, was apparently the name of a Greek female slave who ground corn, or rather, wheat, since the Greeks did not have the plant we call corn. Wood's "Class-book of Botany," however, says the name signifies a miller's wife, which perhaps amounts to the same thing! Whatever the derivation, the fact is plain that the name was applied to our plant because of the mealy appearance of the blossoms.

The Latins called the garlic *Allium* and by that name this plant and all its pungent relations have continued to be called. An onion-like genus of the South is known as *Nothoscodium* from two words meaning false onion. The generic name of the star-of-Bethlehem is *Ornithogalum* and the application of this has always been a puzzle, for it signifies bird's milk. One translator hazards the guess that is refers to the milk-white flowers like the white of an egg, but this seems an explanation made for the occasion with no basis in fact. The grape hyacinths, natives of Europe but naturalized in some places on this side, are found in the genus *Muscaria* named for the musk-like odor of some species. The true hyacinths belong to the genus *Hyacinthus* which probably commemorates that Hyacinthus of Grecian fable who was accidentally killed by Apollo and from whose blood the first hyacinths are reputed to have sprung. The description of the original hyacinths, however, does not appear to fit our plants. One of the flowers often associated with the hyacinth is the Asphodel of the genus *Asphodelus* which, in the Greek, means unsurpassed, and is said to allude to the beauty of the flowers. This may have been true of the first flowers to bear the generic name, but in the shifting of terms so common in botany, the name is now anchored to plants which hardly come up to the specifications.

The plants usually placed in the Lily-of-the-Valley Family are less lily-like in appearance than those previously mentioned, but the family name, Convallariaceae, according to Gray, was derived from a lily—*Lilium convallarium*. Wood says, however, that the name is derived from the Latin *Convallaris*, "a valley," where some species grow. The name of the so-called wild lily-of-the-Valley, *Maianthemum* or *Majanthemum*, is formed from the Greek Maia, one of Pleides, and the word *anthos*, meaning flower. It is truly translated "May-flower." The genus is sometimes known as *Unifolium* mean-

ing "single leaf," though the plant really has two, as the specific name *bifolium* indicates! *Asparagus* is the term by which the Mediterranean people knew our familiar garden plant and the name has come down to us through the ages unchanged.

In the Greek, *Polygonatum*, by which the true Solomon's seals are known, signifies "many knees" and alludes to the knobbed root-stocks. Some botanists call the genus *Salmonia* in honor of Solomon! The false Solomon's seals are placed in the genus *Smilicina*, supposed to be a diminutive of *Smilax*. As to *Smilax*, itself, the name seems of obscure derivation. It is an ancient Greek term and Gray suggests that it may have originally been applied to some other genus. Wood, however, derives the name from a Greek word for a grater and says it refers to the rough stems. A former Governor of New York and patron of science, DeWitt Clinton is commemorated in *Clintonia*.

The paired seeds in the fruits of *Disporum* account for the scientific name which means "two seeds" or "double seeds." A closely allied genus *Streptopus* is named from two Greek words meaning "twisted" and "foot." The English name is commonly rendered "twisted stalk," but "slew-foot" is possibly a more literal if less euphonious translation. When the trilliums are not separated as a distinct family, they are usually grouped with the Convallariaceae. *Trillium*, as is well known, comes from the Latin for three and alludes to the parts of the flower which are rather more conspicuously in threes than in most of the group. The reputed medicinal properties of the single species in the genus *Medeola* caused it to be named for the famous sorceress, Medea. According to fable Medea was familiar with a large number of potent plants which she used in working her spells, but the plants, the medicinal virtues of *Medeola*, and even Medea herself are now known to be mere creatures of the imagination.

The members of the group often known as Melanthaceae are least like lilies of any of the plants usually included in the Liliaceae. The name of the group comes from one of its genera, *Melanthium* from the Greek *melas* "black" and *anthos* "flower." Since the flowers are yellowish, it is difficult to say what Gronovius had in mind when he made the name. It is sometimes suggested that the flowers turn darker after blooming and thus account for the appellation. Another genus, *Veratrum* has a significance nearly synonymous with *Melanthium*. This name is from the Latin *vera*, "true," and *atrium*, "black" but it has no more reference to the color of the flower than has the first, for the flowers in this genus are greenish. The name is said to have belonged originally to the true hellebore (*Helleborus*) and may once have had some other significance. Other genera in this group have the Greek word for flower combined with some modifier in their names, as *Stenanthium* meaning "slender flower" in reference to the slender perianth segments, and *Amianthium* meaning "unspotted," either because of the glandless perianth or the pure white flowers. *Amianthium* is sometimes called *Chrospermum* which means colored seeds.

The pendulous flowers of *Uvularia*, appear to have suggested to Linnaeus the "soft palate" in man, hence the name from *uvula* a palate. Another name by which the genus was once known is *Prosartes* meaning "to suspend." An early New England botanist, William Oakes, is remembered in the *Oakesia* by which a section of *Uvularia* is sometimes known. *Tofieldia* in a similar way honors an obscure botanist of the 18th century who, Gray and Britton say was an Englishman but Wood more explicit, reports to be a Scotchman "residing near Doncaster."

The curious little "devil's-bit" has the name of *Chamaelirion* which is literally "low lily" in the Greek. It seems that

Wildenow, who named the genus, founded it upon an imperfectly developed specimen. *Helonias* is from the Greek for swamp in allusion to the places where some species of this genus grow. *Xerophyllum* is from the same language and means "dry leaf." The name *Narthecium* is said to be an anagram of *Anthericum* from the Greek *Antherikos*, a word said to have been the original name of the asphodel. The genus is also known as *Abama*, signifying "without step," being reputed to cause lameness in cattle.

SLOW RIPENING.—There are all sorts of variations in the length of time different plants require to ripen their seeds. This ranges from a few weeks in some of the early flowers to those deliberate species that ripen their fruits just ahead of the autumn frosts, to say nothing of such examples as are presented by some of the oaks, which take two years to finish the job. Among oddities in this line must be mentioned the maidenhair fern tree (*Ginkgo biloba*) which to all appearances ripens its fruit in autumn, though the union of the contents of ovule and pollen have not taken place. The fruit falls to the earth and lies there while sperm and egg unite and a new embryo develops. Several species of conifers are known which retain their ripe seeds in the cones for ten years or more, but the credit for the greatest deliberation undoubtedly goes to that species of palm known as the double cocoanut or Seychelles Islands palm (*Lodoicea seychellarum*) which is reported to require nearly a dozen years to mature its fruit. The seeds of this palm are probably the largest in the world and often reach a weight of thirty pounds. There is some reason, therefore, for the length of time it takes to ripen.



NOTE *and* COMMENT



UNITED STATES CLIMATES.—In a country as extensive as our own, there is room for a variety of climates. Meteorologists have investigated and mapped each with considerable accuracy. The largest is the Eastern Climatic Province which extends from the Atlantic ocean to the edge of the Great Plains and whose western margin corresponds roughly to the 20-inch annual rainfall line. Over this region the climate is remarkable uniform. Its seasons are strongly contrasted, the summers being hot and the winters cold. The rainfall is abundant and usually well distributed. On the south this region merges into the Gulf Province with higher temperatures, both winter and summer, and with greater annual rainfall. The changes in the weather here are fewer, less abrupt, and less distinct, owing to the fact that the region is rather beyond the belt of cyclonic storms. The Plains Province lies between the Eastern Province and the Rocky Mountains. It is a region of lessened and variable rainfall in which cultivated crops are uncertain without artificial watering, though dry farming is extensively practiced. Most of the rainfall occurs during the growing season. In temperature the region is much like the Eastern Province. The Plateau Province is the region west of the Plains Province. It has a still smaller rainfall and much of the region is arid, especially in the lowlands. Most of the North American deserts are in this province. In the northern part the greatest precipitation is in late winter and early spring; in the southern part the maximum rainfall occurs in late summer and in winter. The western coastal

belt is the Pacific Province. The southern part has a climate like that of Mediterranean countries; the northern, like that of Scandinavia. There are relatively small seasonal changes either in the cool and humid north, or the dry and warm south. The point concerning all this that is of interest to botanists, is that each Province has a fairly distinct flora of its own. Soil, elevation, and other minor factors may influence the relative abundance and local distribution of a species, but it is climate as a whole that controls the range of the majority and makes distinct floras recognizable.

RESISTENT CHESTNUTS.—The chestnut blight, discovered in New York City in 1904, has since swept away practically all the chestnut trees from an area extending from New York and New Jersey to Central Pennsylvania and Northern Virginia and is still spreading. Chestnut forests of commercial importance occur in seventeen States but there appears to be no way by which the disease can be controlled and the nineteen billion feet of this timber still standing seems to be doomed. Whether the chestnut tree is likely to become extinct or not is another matter. According to E. R. Hodson in the *Journal of Forestry*, there are signs that trees in the infected regions are developing an immunity to the disease and that these immune plants may revive and produce a race of resistant trees. Chestnut wood and bark have a number of important uses and the possibility that the mountains in the Alleghany region where the disease has wrought the greatest injury may be reforested with resistant trees is one likely to give foresters much encouragement.

SENSITIVE STIGMAS.—A number of plants are known which have sensitive stigmas with lobes that close when touched. This feature has usually been considered a device for retaining the pollen when brushed from a visiting insect, but F. C. Newcombe recently reported that the closing of the stig-

ma lobes is for the purpose of keeping the pollen grains moist and thus promoting their subsequent germination. In practically all cases where the stigmas are sensitive, they are not enclosed by the corolla tube and are thus exposed to the drying effects of the sun and wind. On sunny days the stigmas of some species close whether stimulated by the presence of pollen or not. The failure of some plants, such as Catalpa, to set an abundance of fruit is thus attributed to the drying out of the pollen on the stigmas. This, however, is certainly not the case with all flowers, for the lilies have strongly projecting stamens and pistils and yet have no difficulty in producing seed-pods.

COMMON NAMES OF EUCALYPTUS.—Australia is famous for its many species of *Eucalyptus*. More than 150 kinds are known. When planted in America they are usually known as gums, but the Australians have many other names for them and often divide the group as a whole into sections known as bloodwoods, mahoganies, boxes, tallow-woods, stringy-barks, woolly-butts, gums, peppermints, ashes, and ironwoods. Among the names for single species are spearwood (*E. doro-*
toxylon), Karri (*E. diversicolor*), jarrah (*E. marginata*), kino (*E. resinifera*), tooart-tree (*E. gomphocephala*) yate-tree (*E. cornuta*), and cider-gum (*E. Gunnii*).

HARDWOODS AND SOFTWOODS.—The woodworker has found it convenient to divide the various species with which he works into the two groups of hardwoods and softwoods. There is no hard and fast line for separating the two groups, but it happens that the softwood group very nearly corresponds to what are known to the botanist as Gymnosperms, that is, the pines, cedars, spruces and the like, while the hardwoods are mostly derived from the Angiosperms or true flowering plants. There are many exceptions to this rule, however. In our own country the basswood, whitewood, cottonwood and cucumber-tree, to mention only a few, have wood softer than

that of many of the pines, while in the Tropics many Angiosperm woods are found that are softer than ordinary Gymnosperm wood, in fact the softest and lightest wood in the world is found in this group. Among Tropical Angiosperms with extremely soft wood are species of *Ochroma*, *Erythrina* and *Eriodendron*. It is suggested that the wood of Gymnosperms hereafter be called coniferous wood, as being more exact than the old term of softwood.

RARE CALIFORNIA PLANT.—In a new seed catalogue issued by Luther Burbank we read this astonishing statement: "The *Escholtzia Californica* is almost always called California poppy; it is not a true poppy. The *real* California poppy is an exceedingly rare plant growing in only two places in the world and is not even mentioned in cyclopedias and botanies." California, to be sure, covers a large area and doubtless has many rare species, but it seems little short of negligence for her botanists to allow such a rare species to go undescribed until attention is called to it in a seed catalogue. Seeds are offered at 20 cents a packet and if they delay much longer some Eastern botanist might invest twenty cents and beat them to it. Incidentally one wonders why a catalogue purporting to be issued by Luther Burbank should print such nonsense.

EDIBLE LILIES.—The lily family contains a number of edible species, ranging from the familiar onion, leek, and garlic to the more aristocratic asparagus, but none of these are true lilies in the sense that they belong to the genus *Lilium*. They are merely lilyworts. According to Harshberger's "Pastoral Botany," however, the Chinese eat the bulbs of the tiger lily (*Lilium tigrinum*) which they call "Chia-peh-ho." The flowers of another species (*L. Sargentae*) are also said to be eaten in China after being boiled, dried in the sun, minced, and fried with salt and oil. The mixture does not sound appetizing and most folks would scorn to treat any lily in such

a manner. The flowers of the familiar yellow day lily or lemon lily (*Hemerocallis flava*) which, in spite of the lily part of its name, is not a true lily, are also said to be eaten by the Chinese.

MUCH TRAVELED FERN SPORES.—In a recent number of *Ecology*, Douglas H. Campbell suggests, among other reasons for assuming a land connection between the Hawaiian Islands and other land areas in the Southern Pacific, that some Hawaiian ferns are common to the two regions adding: "It is difficult to conceive any means of transport from distant New Zealand or the mountains of Java and New Guinea to the mountain forests of Hawaii which would enable the spores of these delicate plants to survive the exposure of such a journey." The distance is four or five thousand miles, but we are disposed to think this no unusual journey for fern spores. The writer of this paragraph put on record in the *Fern Bulletin* for 1911, a much more marvellous occurrence in the same line. *Asplenium alternans* whose haunts are in the Himalayas and Abyssinia was found in Arizona by James H. Ferriss, quite ten thousand miles away from any other known locality. This is probably the record for long distance travelling by fern spores.

RED-ROOT AND THE PIGS.—There is a difference in pigs, notwithstanding the aphorism that "pigs is pigs." Harshberger's "Pastoral Botany" notes that the red-root (*Lachnanthes tinctoria*) is eaten without harm by black pigs but that it invariably poisons white ones. Examination of the bones of pigs poisoned in this way shows them to have been colored a reddish-pink. The plant ranges from Massachusetts to Florida growing in coastal bogs and in this region white pigs are consequently in the minority. The same volume records a similar connection between white cattle and sheep and the common St. John's wort (*Hypericum perforatum*). If such animals

eat the plant, they are likely to develop an acute inflammation of the skin, but black-skinned cattle go unharmed. Apparently the trouble requires sunlight for development for if white skinned cattle are painted black with a mixture of charcoal and linseed oil, they too escape.

CONSIDER THE HAWTHORNS.—The craze for making new species in the hawthorn genus (*Crataegus*) having to a considerable extent subsided, it is possible to pause for a moment and take account of stock. When the hawthorn mania was at its height, there were supposed to be at least a thousand good species in the genus, but now, according to the second edition of Britton and Brown's "Illustrated Flora," the number has shrunk to some three hundred. In North America, from the Atlantic Ocean to the Mississippi Valley and from Virginia northward, there is reported to be 73 species. Eighty-four other forms are regarded as variations or possibly hybrids of those designated as distinct species and are relegated to synonymy. "Gray's Manual" is still more conservative, in this respect since it recognizes but 65 species. It also includes 44 "varieties" and thus really outdoes the Britton and Brown work which is regarded as fairly radical. Gray, however, reduces 34 other described species to synonyms. Even with Gray's liberality, some of the reputed species from Illinois fail to be mentioned at all. Since most of the recent species were named for botanists, botanizers, and their friends, this wholesale reduction to synonymy of botanical lights might be viewed as little short of a calamity. Still, in botany as in many other things, it may be better to have been named and reduced to synonymy than never to have been mentioned at all!

DOGBANE INSECT TRAPS.—In general, plants are pretty well adapted to their situation in life, but certain species appear to show the effects of over-specialization. This is especially true of devices for pollination which in several cases

function so well from the mechanical side that they interfere with pollination by trapping the pollinating insects. The pockets in which the common milkweed conceals its pollinia often catch and hold visiting insects by the legs or tongue and thus cause their death. Several other plants, in the same family are known as "cruel plants" from their habit of catching insects in similar ways. One plant in particular has an arrangement, somewhat like the old-fashioned boot-jack, at the base of the pistil which allows insects to thrust their tongues through in search of nectar but which catches them on the return. The harder the insect struggles to release itself, the more firmly does its tongue become fixed in the trap. Traps of this nature are not confined to the milkweeds, however. They are found in the closely related dogbanes. A good illustration is found in the case of the common dogbane (*Apocynum androsaemifolium*) which, Raymond C. Osburn reports in *Ohio Journal of Science*, murders the little syrphid fly, *Mesogramma marginata*, by wholesale. As many as four flies have been found caught by a single small flower. Other flowers examined gave indications that the insects had been caught but had finally escaped by pulling off part of their proboscis or, not infrequently, by pulling their own heads off. A count of the first hundred flowers at hand showed that 81 had captured insects, the total number of captures being 140. Although the pinch-trap of these flowers is so much like that of their larger relatives, it appears that they do not hold even small insects unless their probosces are gummed up with the adhesive nectar. The flies were seen to enter one flower after another, only to be caught at last when their tongues were smeared with nectar.

A VARIETY OF VARIETIES.—In systematic botany, any form that did not appear distinct enough to be a species was once called a variety, but it has recently been pointed out that varieties may spring from different causes and thus be very

different in value. There are, first of all, the variations properly classed as freaks and not to be included with regular variations. Of true varieties there are varieties due to geographical position, edaphic forms due to soil conditions, forms due to varying life cycles, such as annual forms of perennial species, seasonal forms due to temperature, elementary species and various color forms. There are also juvenile forms and perhaps others. The longer we study plants, the more there appears still to be learned about them.

DECADENT SPECIES.—An immense number of plants and animals have appeared on the earth and, after an existence extending over perhaps a million years, have declined and disappeared. We commonly assume the extinction of such forms to be due to untoward circumstances, such as sudden and extreme changes of climate, elevation or subsidence, the advent of more vigorous forms, the ravages of disease etc., but while all these forces may have played a part, there are some grounds for thinking that the species itself may have a more or less definite term of life and, as it were, carries its death warrant with it. It is often assumed that variation in animals and plants results in keeping each species fairly well adjusted to an environment that is not subject to sudden change, but recent observations on the ostrich incline the scientist to the idea that in this species, at least, there is an inherent tendency toward degeneration, already manifested in the character of the feathers, the loss of toes, and the lack of powers of flight. If this degeneration should continue, say the scientists, the ostrich is on the way out. Possibly many members of the ancient fauna and flora were similarly situated. Who knows that a given species can last forever? Is it not possible that species as a whole have a youth, maturity, old age and death similar to that of the individual?

EDIBLE FLOWERS.—Flowers and flower-buds are seldom

used for food, though we must not overlook in this connection, the cauliflower, which is a sort of abnormal flower-cluster, the true artichoke, which is a flower head, and capers and cloves, both buds. Rose petals and violet flowers are sometimes made into conserves, but one must go to the warmer regions of the earth to find flowers taking a prominent place on the bill of fare. One of the most conspicuous in this respect is the flower of the mahua tree (*Bassia latifolia*), a species belonging to the Sapotaceae. According to the *Quarterly* of the Royal Botanic Society of London more than a million people in India regularly use the flowers as an article of food. The consumption per individual is not far from eighty pounds annually. The tree blossoms in March and April, at which time the ground beneath it is carefully cleared to receive the thick, juicy, globular corollas as they fall. These are gathered by the women and children and spread out in the sun on mats to dry. A single tree will yield 300 pounds of blossoms a year. When fresh, the flowers are extremely sweet and often contain 40 to 70% of sugar. They have a peculiarly pungent taste and characteristic odor. They are eaten in both the fresh and the dried state and are cooked with rice, cocoanut, or flour. A second and different crop is later obtained from the same tree, for the seeds yield an edible fat called "Ilipe butter" which finds its greatest usefulness in the manufacture of soap and candles.

HAWTHORN VS. THORNAPPLE.—A good illustration of the indefiniteness of some common names is found in the terms applied to the species of *Crataegus*. The name hawthorn seems pretty well restricted to Europe and appears to be rarely used here except by those who get their common names from the books. In America the species are probably more commonly known as thorn-apples or haws. Frequently they are called red haws to distinguish them from the black haws

(*Viburnum*). There seems to be some question, however, as to how extensively thornapple or haw is used. Prof. J. C. Nelson writes that in southern Indiana and northern Kentucky he has never heard the term thornapple used. In other parts of the country, thorn-apple is the name regularly used though it is well understood that there are other plants that bear it, the jimson weed (*Datura*), for instance. It would be interesting to know to what extent haw, thornapple, and hawthorn is used for the plants in question.

ABSURDITIES OF NOMENCLATURE.—The exaltation of priority as a means of securing a stable nomenclature began about twenty-five years ago and has raged with more or less intensity ever since. The ornithologists are reported to have made the most progress toward the end in view but, as is usual when one becomes too deeply engrossed with a subject, they have pushed some forms of nomenclature to a point where they appear only ridiculous. Since there is some danger that botany, if not intelligently directed, may fall into the same errors, we may point out a few of the more conspicuous. To one interested in sanity in nomenclature, the most nonsensical custom is the doubling of the specific name in the case of the original variety or species. The common meadow lark, for instance, is known as *Sternella magna, magna* which might be translated, we suppose, as the great, big meadow lark, just as *Spizella pusilla pusilla* must mean the tiny, little field sparrow and *Astragalinus tristis tristis* the sad, sad goldfinch. It was once thought that botanical names might claim the prize for nonsense with such absurdities as *Sassafras sassafras sassafras* and *Lablab lablab lablab* but these are quite overshadowed by *Cardinalis cardinalis cardinalis cardinal*. There is no use in arguing against it; the beauties of a binomial system of nomenclature are many, and the cardinalis combination is the gem of the whole collection.

THE ANCIENT FLORA.—Those unfamiliar with the early history of the American flora may have the impression that the plants we now see about us are the descendants of those which first lived in the locality and resemble them in general appearance, but nothing could be further from the facts. The flowering plants, especially, seem to be rather recent comers on our planet, comparatively speaking. There were perhaps millions of years during which the vegetation contained no example of a plant with flowers. Apparently mosses, algae, ferns and similar plants were much earlier. Since plants first began to be, great changes have taken place in the surface of the earth and there have been correspondingly great changes in the plant covering. The ages just preceding the present were particularly characterized by such changes, and Edward W. Berry writes of them as follows: "During the upper Eocene and lower Oligocene the climate of our Gulf tier of States and southern Europe became strictly tropical and the region was overrun by an appropriate tropical vegetation while the temperate forests pushed into the polar regions until most if not all the lands within the Arctic Circle and part at least of the Antarctic continent were forested by cool temperature plants. The most extensive of these polar floras is that recorded from western Greenland (latitude 73°) which included nearly 300 different species. Eighteen of these are ferns, 28 are conifers including the ginkgo, incense cedar, cypress, and numerous sequoias and pines; 21 are monocotyls including two palms; and a vast abundance of dicotyledonous leaves of willow, poplar, alder, hazel, beech, oak, elm, sycamore, walnut, ash, serviceberry, sumach, dogwood, gum, grape, magnolia, maple, holly, buckthorn, hawthorn, etc. Traces of this flora are found in Grinnell Land, Spitsbergen, Iceland, Siberia, and elsewhere to within 8 or 10° of the North Pole in a region that has since become a desert of snow and ice. In the southern United

States at that time one of the prominent features of the vegetation was the abundance of palms represented by the impressions of leaves and much petrified wood. Among the palms are *Thrinax*, *Bactrites* and *Palmetto*, and a well-marked date-palm is represented by characteristic seeds. Nutmegs are also represented by fruits, as are the copaiba gum, the saponaria, and the carapa. The leaves preserved include mangrove, satin-wood, citrus, stopper, button-wood, canna, sea grape, climbing ferns (*Lygodium*), the tropical marsh fern (*Acrostichum*), the cinnamon fern, and many other tropical types. There were at least four separate times when ice-sheets accumulated over the land. Each of these lasted from 10,000 to 20,000 years, and they were separated by long intervals of genial climate known as the interglacial periods of thousands of years duration during which the floras spread northward to even beyond their present range. During the epochs of glaciation these temperate forests retired southward and gave way along the ice front to arctic willows and dwarf birches. The post-glacial amelioration of the climate, the opening to occupation of areas that had been covered with glaciers and the mixing of soil through ice action all combined to stimulate evolutionary activity in the plant kingdom, particularly among herbaceous forms. It seems probable that the characteristic Temperate Zone herbaceous families date from about this period.



EDITORIAL



A subscriber who recently ordered this magazine for three years in advance stipulated that if we should suspend publication during this period, we would return the amount of his unexpired subscription. In case any other reader has doubts of our stability, we may say that the number of subscriptions for the volume just beginning is so large that we have had to increase the number of copies printed, that volume 26 is already so rare that we cannot supply it except in complete sets and that there are only about twenty-five such sets still on hand. The magazine has not even considered the idea of suspending!

* * * *

One who has taken this magazine for a number of years writes, "I am not much of a botanist but find much in the magazine that is interesting if not exactly useful." This is the right spirit. Our correspondent realizes that one ought to know something about the plants whether the information can be turned into cash or not. Prospective subscribers sometimes write us that the magazine is too difficult for beginners, overlooking the fact that beginners do not long remain such and soon demand more advanced matter. Besides, who wants to take a publication that contains information with which one is already familiar? One needs a few articles somewhat beyond his reach to keep him up to the mark and furnish new food for thought. When a publication contains nothing that one does not already know, it is time to remove it from his list.

* * * *

For some time our National Government has been setting aside certain tracts of land valued for their scenic beauty for

the use and enjoyment of all the people. Unfortunately for the safety of such tracts, they contain various streams and waterfalls which might be developed as sources of power and these have long been regarded with covetous eyes by certain private interests who would destroy the finest view on earth if it could be turned into dollars. It has been seriously suggested that the falls of Niagara would be much better employed in turning mill-wheels than running to waste for the delectation of visitors. In the past, all attempts of private individuals to turn our National Parks into profit for themselves have been defeated, but new schemes are constantly being brought forward and disguised as projects for benefitting the people of the region, may ultimately succeed if we are not eternally vigilant. It is likely that there is considerable water-power on the public lands, but this nation is certainly large enough and rich enough to spare an occasional waterfall simply for the pleasure its beauty gives. If a single company is allowed to begin water power development in our parks, others will follow and the damage will soon be irreparable. Those who believe that life is something more than mere existence should make it plain to those who represent them at Washington that our National Parks should not be exploited by private interests.

BOOKS AND WRITERS

Le Naturalist Canadien of Quebec, the only natural history publication outside of France which is printed in the French language, has recently received from the Province of Quebec, a subvention of \$400 a year for the carrying on of its work. This is well merited recognition of *Le Naturalist Canadien* and the important part it plays in the education of

the public. Both the magazine and the people of Canada are to be congratulated on the aid to science thus given. The United States, though possessed of infinitely greater wealth than Canada, allows its scientific publications to struggle along as best they can. We constantly boast of our scientific attainments, but as a nation we fail to adequately encourage the lines of work that make us great. Rich men endow universities, libraries, hospitals and laboratories, but the scientific press is pretty generally financed by scientific societies whose members often can ill afford the expense. It will be a great day for science when some person of wealth makes possible a truly great scientific journal by means of a modest subsidy.

The first two parts of "Pflanzen-Teratologie" by Dr. O. Penzig has been received from the publishers, Gebruder Bornträger, Berlin W.35, Germany. This is a truly monumental work on abnormal plants for which the author has been gathering material for more than twenty-five years. The abnormalities discussed fall into more than 150 divisions. The first part of the work is an enumeration of the articles relating to the subject arranged in chronological order under each author's name. Then follows a discussion of these departures from the normal, as observed for each species, arranged in systematic sequence, the part just received beginning with the Ranunculaceae and ending with the Hypericaceae. A more exhaustive treatise of this kind has apparently never been published. The work is in the German language and therefore not as useful on this side as if written in English, but those who read German will find it a most complete account of abnormal plants. The price of each part is 48 marks.



MARSH AND DUNE, RESERVOIR CANYON



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*And all the mead was wide unrolled,
With green and silver, green and gold,
Where buttercups and daisies spun
Their shining tissues in the sun.*

—Julia C. Dorr.

MIDSUMMER FLORA OF TUBA OASIS

By WILLARD N. CLUTE

In the February number of this magazine I published a short account of the Painted Desert in Arizona and its most important oasis, Tuba. I have twice visited Tuba in quest of plants and upon my second trip, in the summer of 1920, I made a collection of all the visible plants of that interesting region. Since practically nothing has been written about the flora, it seems desirable to set down here a more circumstantial account of the plants observed, in the expectation that it may serve as the basis for further explorations.

Although my collection was made in July, it is probably more nearly complete than such a collection would be if made in a different climatic region or made at a different time in this one. The spring months are nearly rainless and many plants do not renew their growth or bloom until late in June or early July when the rainy season begins. There is, to be sure, an earlier burst of bloom at the end of the winter season, but if the flora of this earlier time contains annuals or herbaceous perennials that are not represented in summer, their disappearance is so complete as to leave no sign. The true des-

ert plants are nearly all woody perennials and, of course, are conspicuous features of the desert at any time of the year.

The plants of the oasis, proper, are more often herbaceous perennials or, in some cases, annuals and are not limited to certain seasons of growth, as the other plants are, by a lack of water. The vegetation of the springs, seeps, rills and reservoirs is the usual one. The plants have the appearance of the water plants in other parts of the world and, in fact, consist of the identical species that inhabit more humid regions.

No matter from what direction Tuba is approached, the eye picks it out while still far distant, for the deep green of its spiry poplars and clustering fruit trees is in sharp contrast to the prevailing red and gray of the desert. After a long trip over the shifting sand dunes and bare rocks of the adjacent region the sight of its verdure is a most welcome one. The transition from desert to arable land at Tuba is always so sudden as to be noticeable. The hot red sands come up to the very edge of the oasis and push in wherever the boundaries are not defended by water. The oasis itself is so circumscribed as to appear like an island. There is no spot within its confines from which the desert is not visible.

Owing to the close contact of the desert and oasis, it is sometimes difficult to decide to which region certain plants on the border-land belong. In making up the accompanying list, however, I have chosen to exclude those species that are found pretty generally distributed in the desert, aiming in this discussion to present only those plants that one might expect to find in any locality in the desert where water comes to the surface. In a later paper the flora of the desert, itself, will be considered.

The arborescent flora of the oasis is limited to the species brought in by the white inhabitants. Most important and conspicuous are the Lombardy poplars which are so constantly

associated with Mormon settlements as to be known as the Mormon tree. No other tree in the desert seems to thrive so well. A list of the other shade-trees includes the Arizona cottonwood, mulberry, catalpa, ailanthus, osage orange, and honey locust. One of the principal industries of the region is that of fruit growing. Apples are extensively planted and in smaller numbers are found peaches, apricots, pears, almonds, and occasionally a cherry. I saw no cultivated plums but a wild plum (*Prunus Americana*) clustered close to the cultivated fields may have served as a substitute.

One of the surprising things connected with the flora is the fact that exclusive of cultivated plants, fewer than seventy-five species, practically all of which are weeds of wide distribution, are found in the oasis. One seems warranted in the inference that cultivation of the soil has destroyed such native plants as once existed and made room for the usual companions of our cultivated crops. More than thirty percent are of Old World origin and forty percent of the others are American plants of wide distribution, at least in the western half of our country. Only a mere handful have been derived from nearby regions or from the desert, notwithstanding the intimate contact of the two areas. Only four species have fruit adapted to being distributed by birds, and three others possess burs which might be distributed by animals. All the rest are adapted for wind distribution, being either winged, equipped with a pappus, having dustlike seeds, or of the form known as tumble-weeds

The plants in this list have been kindly identified for me by Dr. P. A. Rydberg of the New York Botanical Garden whose familiarity with western plants is attested in his "Flora of the Rocky Mountains" and other publications. The names here used differ in some respects from those sanctioned by the Vi-

enna Code, but the differences are never great enough to cause confusion. The numbers following the species are the numbers under which they were collected.

LIST OF SPECIES

Equisetum intermedium (A. A. Eaton). Fernworts are seldom found in the desert. This species was frequent in wet places. The remains of fertile catkins indicate that its season of fruiting is much earlier. 132.

Adiantum rimicola Slosson. VENUS' HAIR FERN. About a dozen plants were found under a sandstone cliff at Reservoir Canyon. The species is what is ordinarily known as *Adiantum capillus-veneris*. 88

Typha latifolia. L. CAT-TAIL. This common inhabitant of wet places was more luxuriant than I have ever seen it elsewhere, reaching a height of ten feet or more. At Reservoir Canyon and in reservoirs at Tuba.

Polypogon monspeliensis (L.). This small grass, a native of Europe, may be found in many moist spots. It has much the aspect of the common corn grass (*Setaria*) but is much smaller. Stock is not very fond of it. 124

Phragmites Phragmites (L.). REED. A reed-like grass well known for its tall culms in wet places. At Tuba the leaves are always covered with green plant lice. 85

Distichlis stricta (Torr.). SALT-GRASS. Abundant on the Government farm in Moenkopi Wash and elsewhere. Called "Johnson grass." It spreads by underground runners, is hard to eradicate, and is regarded as a pest. 66

Cenchrus Carolinianus Walt. SAND-BUR. This familiar plant finds the sandy soil of the orchard at Tuba quite to its liking. 92

Eleocharis palustris L. A characteristic wet-ground plant

throughout most of the United States and very abundant in Moenkopi.

Scirpus Americanus Pers. THREE-SQUARE. Another widely distributed plant plentiful in wet places. 80

Scirpus occidentalis (Wats.) BULL-RUSH. This giant rush is similar in appearance to the lake rush (*S. lacustris*) of which it is sometimes regarded as a variety. Characteristic colonies are found in several of the reservoirs. Cattle are fond of it and wade into the water for it. 128

Juncus Torreyi Coville. Plentiful in dryish soil. 67

Juncus Mexicanus Willd. In rather dryish places abundant. 65

Yucca sp? Two kinds of yucca are abundant in the desert and may be found in the oasis. They were in full fruit in 1919 but for some reason failed to fruit in 1920 and could not be identified. The yucca seems destined soon to disappear since the immature plants are eaten by sheep and goats.

Serapis gigantea (Dougl.) HELLEBORINE. Apparently the only orchid in the oasis. A considerable colony was found about the large reservoir at Tuba. 83

Salsola pestifer A. Nels. RUSSIAN THISTLE. This well known plant is very abundant in the desert, often in pure sand, and is equally plentiful in the oasis. The young plants are readily eaten by all kinds of stock. 10

Atriplex hastata L. This is the species that is found in waste grounds throughout the United States but is here a bit thicker and scurfier as befits a desert inhabitant. 63

Atriplex spatiose A. Nels. A species with much the appearance of *A. hastata* common along the roadside at Tuba. It is not included in the Flora of New Mexico and its center of distribution is much farther north. 127

Atriplex canescens (Pursh) SALT-BUSH. Plentiful near the

school at Moenkopi. It is one of the most abundant plants on the plains and is often called chamiso and sage-brush. It is not, however, the plant usually designated as sage-brush. 5.

Amaranthus blitoides S. Wats. SPREADING PIG-WEED. This common weed was abundant in the gardens at Tuba.

Tryptocalyx cyclopterus (A. Gray) SAND VERBENA. In waste ground. After flowering the fruits develop broad wings which make the plant very conspicuous. 95.

Portulaca oleracea L. PURSLANE. Very common. This plant is occasionally eaten as a pot-herb, but I could not discover that the Indians made use of it though their food plants are very limited as to variety.

Clematis ligusticifolia Nutt. VIRGIN'S BOWER. This is the western analogue of *C. Virginiana*. It climbs over the vegetation in many places and is especially luxuriant at Reservoir Canyon. It thrives in cultivation and its thicker, darker foliage makes it rather superior to the common form for such purposes. 86.

Batrachium tricophyllum (Chaix). WHITE WATER-CROWFOOT. A few specimens were found in a reservoir at Tuba, probably carried thither on the plumage of water birds. 130.

Halerpestis cymbalaria (Pursh) SEA-SIDE CROWFOOT. The common name of this buttercup is scarcely appropriate for a species that is abundantly distributed over the desert. Found in many moist spots and very plentiful in Moenkopi Wash. 98.

Pleurophragma platypodium Rydb. In dry ground not far from streams. The plants put up flowering shoots, often six feet high, from a tuberous root. The rosette of leaves has usually perished by the time the flowers open. 82.

Sisymbrium nasturtium-aquaticum L. WATER-CRESS. Abundant in many rills with all the appearance of a native. It may have been introduced, but this is not likely. 107.

Diplotaxis muralis L. SAND ROCKET. A small colony was found near the Indian School. This is a widely distributed European weed. It is reported from California but is not mentioned in the Flora of New Mexico. 111.

Peritoma serrulatum (Pursh). ROCKY MOUNTAIN BEE-PLANT. This plant with the aspect of the garden spider-flower (*Cleome*) is very abundant. The pink flowers with long exserted stamens renders the plant rather attractive though the herbage is malodorous. 11.

Wislizenia refracta Engelm. YELLOW CLEOME. This is the most abundant weed in the region. It blooms when from three inches to three feet high, depending on the soil and moisture. Apparently a good bee plant. It is reported to range from Texas to southern New Mexico but is apparently rapidly extending its territory. 57.

Rosa Arizonica Rydb. Abundant along the rill from the largest spring in Tuba. In July the plants were well set with bright red fruits. 106.

Glycyrhiza lepidota Nutt. WILD LIQUORICE. A widely distributed plant with dense racemes of cream-white flowers followed by prickly pods. Plentiful in the orchard at Tuba where it is regarded as a weed. 77.

Rydbergiella praelonga (Sheld). Specimens of this much-named and variable species were found in fruit north of Tuba. Frequently listed as *Astragalus praelonga*. 121.

Linum pratense (Norton). WILD BLUE FLAX. A few specimens of this segregate from *L. Lewisii* were found on a springy bank west of Tuba. Not reported from New Mexico. 116.

(TO BE CONCLUDED.)

A CURIOUS ABNORMALITY IN CUSCUTA CUSPIDATA

By T. G. YUNKER.

RECENTLY the writer had the privilege of examining a number of specimens of *Cuscuta* that Mr. C. C. Deam, State Forester for the State of Indiana had collected in that state during the summer of 1920. Among the specimens was a collection of *Cuscuta cuspidata* Engl. which Mr. Deam states was found about two miles south of New Hormony, Posey County. The presence of this species as far east as Indiana is in itself an interesting fact, the writer knowing of only one other specimen having been found in the state. This specimen, however, shows an interesting teratological condition that will bear reporting upon, it is believed, inasmuch as there is no record, so far as known, of this condition occurring in any species of *Cuscuta*.

Upon first observation the specimen was seen to be a *Cuscuta* but it showed no resemblance to anything ever seen before by the writer. All of the flowers had apparently become spikelets made up of bracts. Closer observation revealed a few normal flowers of *Cuscuta cuspidata* and also some which showed a transition from the normal flower to the complete spikelet formation. Had it not been for the presence of some normal flowers in the specimen exact determination of the species would have been difficult. The inflorescence appeared about normal for the species with the spikelets occurring in the place of flowers. The spikelets were of lengths varying from about a quarter of an inch to half an

inch and were terete. There was no indication that the spikelets had reached their maximum length and it is not known how long they might have become had they been allowed to continue growing.

Careful dissection of a number of the spikelets failed to reveal the least indication of floral parts. The bracts making up the spikelet are of the same shape and character as those composing the bracts and calyx of a normal flower.



1.—Abnormal inflorescence of *Cuscuta cuspidata*. 2.—Normal flower, Both enlarged about 5 times.

The host was *Ambrosia trifida*. This plant is frequently attacked by *C. cuspidata* without causing any abnormal flowers so one can conclude that the host probably had no influence in the production of the spikelets. One suspects in a condition of this kind that perhaps an insect or fungous pest may have brought about the abnormality, but careful dissection and microscopic examination of the spikelets and of the stems in the vicinity of the inflorescence failed to reveal anything that would indicate the presence of either an insect or fungous cause.

PLANT NAMES AND THEIR MEANINGS--VII

LILIACEAE--II

BY WILLARD N. CLUTE

THE Liliaceae, or lily family, includes two very different groups of plants. One group with characteristic lily-like flowers, is so distinct in appearance that the casual observer would readily identify most of the species; the other, with flowers constructed on the lily pattern, is yet noticeable different and its members are often a source of perplexity to the beginner, though easily distinguished by the more experienced student. It happens, therefore, that many plants called lilies by the novice are not true lilies in the sense of belonging to the genus *Lilium*, while others are scarcely recognized as lily-worts though true members of the Liliaceae. In most cases the difficulty is not in recognizing the lilies, but in distinguishing the small points of difference that separate one genus from another.

In the Eastern United States, or rather in the region usually covered by the Manuals, there are only three species of lily that have acquired vernacular names. The first of these to bloom is *Lilium Philadelphicum*. It is partial to forested areas where its large, erect, deep-red cups are common and conspicuous. It is therefore appropriately called "wood lily," "red lily," "glade lily," "wild orange lily," and, possibly "huckleberry lily." Whether "flame lily" and "fire lily" also allude to the color of the flowers or to the fact that these are often the only flowers seen after a fire has swept through the woodlands, is hard to determine. "Philadelphia lily" is,

of course, merely a translation of the specific name given to the plant because it was first known from the region of Philadelphia. The name of "tiger lily" belongs by rights to *Lilium tigrinum* but it is often carelessly applied to this plant. *Lilium Canadense* is a common lily of open grassy places. Its nodding bells, which may be either yellow or red are often seen in meadows and thickets. It is probably most frequently known as "wild red" or "wild yellow" lily. "Field lily" alludes to its place of growth, as "nodding lily" does to its habit of growth, while "Canada lily" is merely a translation of its specific name. The flowers of *Lilium superbum* are half nodding and the segments are rolled back in such a way as to suggest a turban. The species is commonly known as "Turk's cap" or "Turk's head," though the name is imported and belongs to the true Turk's cap" (*Lilium martagon*) of Europe. Our species also resembles the "tiger lily" (*Lilium tigrinum*) of China and Japan and is often called "tiger lily," or "nodding tiger lily" in consequence. The real "tiger lily" is occasionally found as an escape in our region.

Another Old World plant rather extensively naturalized here, which bears the name of "tiger lily" is a species of *Hemerocallis* better known as the "orange day lily" (*H. fulva*,) The name "day lily," like the generic name, refers to the evanescent nature of the flowers, though it may be said that they frequently last longer than a day. The name of Eve's thread, reported to be applied to this species, is doubtless due to its being confused with some species of yucca, while "fire lily" is clearly a misnomer. A second species of *Hemerocallis* (*H. flava*) with yellow flowers is the "lemon lily" or "yellow day lily" while two species with orange bells that bloom earlier are known as "copper lilies" (*H. Dumortieri* and *H. Fortunei*). The species of *Funkia* usually known as "plantain

lilies" are sometimes called "day lilies." The species most frequently known thus is the "white day lily" (*F. grandiflora*.) The leaves of these plants are short, broad and heavily veined like those of the common plantain, which probably suggests the name of "plantain lily."

The lily-like flowers of the *Erythroniums* have caused them to be known in some places as "yellow lilies" and "yellow bells." They are far more frequently known as "adder's tongues" a name to which the leaves, spotted like an adder, give significance. To this circumstance also we probably owe such appellations as "snake-root," "rattlesnake violet" and lamb's tongues." "Trout lily," "fawn lily" and trout flower" are book names of recent origin invented by sentimentalists who may dislike to associate these handsome flowers with reptiles. A very ancient name for this plant is "dog-tooth violet." This was bestowed upon it at a time when violet might mean any conspicuous flower. The shape of the petals in the European species like a dog's tooth, is said to be responsible for the first part of the name and the same idea is indicated in its specific name, *dens canis*. The term "yellow hookers", by which the flowers of *Erythronium Americanum* are known in parts of Pennsylvania, appears to be another reference to violets since hooker is a common term for violets there. *Erythronium albidum* is known as "spring lily," "deer-tongue," "white adder's-tongue" and "white dog-tooth violet," all of which are intelligible in the light of what has already been said of the yellow species.

The largest species of *Trillium* is often known as "wood lily." This is *Trillium grandiflorum*, a magnificent flower that often dominated the underwoods just as the trees are putting out their leaves. Although not a lily, the name fits very well. This plant also bears the name of "Trinity lily," all of its parts

being in conspicuous whorls of three. Had the plant existed in Ireland, it is probable that there would now be less discussion as to the identity of the shamrock on the seventeenth of March. Most of the species of *Trillium* are known as "wake-robin" and this one is called the "large-flowered wake-robin." The original "wake-robin" is the "cuckoo-pint" (*Arum maculatum*) of Europe. This latter species has three-parted leaves which seems to have been warrant enough for the transfer of the common name to our plant by the early colonists, regardless of the numerous differences between the species.

The dull, red flowers of *Trillium erectum* are so out of the usual order that they have attracted the attention of even the unbotanical, as numerous common names attest. Among these are "red trillium," "purple trillium," "nose-bleed," and "red benjamins." The word "benjamin" appears to have been derived from *benzoin* through *benjoin*. Our plant, is of course, only distantly related to the true benzoin but its use in medicine may have suggested its name. The plant once had some repute among the Indians for medicinal qualities, hence "squaw-root," "birth-root" and its variants "beth-root" and "bath-root." The species is also called "shamrock" in allusion to its three leaves. The odor of the flowers, suggesting that of a wet dog, is responsible for "ill-scented trillium" and "dog-flower." I am at a loss to account for such names as "lamb's quarters," "bumble-bee-root," "true-love" and "orange blossoms." "Herb Paris" is a misnomer. The plant entitled to this name is *Paris quadrifolia* of Europe, a member of the trillium family. Since all the *Trilliums* are American, their vernacular names must have been acquired or transferred from other species since the country began to be settled.

The reputed medicinal virtues of the *Trilliums* are again reflected in such names as "cough root," "snake-bite" and

"rattlesnake-root" applied to *Trillium cernuum*. The last two names may perhaps refer to the shape of the rootstock which terminates suddenly as if bitten off. This is another plant called "white benjamins." The drooping habit of the plant makes "nodding wake-robin" appropriate, and "ground lily" is of obvious application, but why it should have been called "Jew's-harp plant" is hard to imagine. *Trillium undulatum*, with pencilled lines of purple deep in the corolla, is the "painted wake-robin." This is also another of the "benjamins." "Wild pepper" is a name given to the plant in allusion to the hot biting sensation experienced when the root stock is chewed. The lurid flowers of *Trillium sessile* bear the names of "nose-bleed," "bloody noses" and "bloody butcher." The plant is also known as "three-leaved nightshade." *Trillium nivale* is the "snowy trillium" as its specific name indicates. It is the smallest, earliest, and one of the most interesting of its tribe, coming at the time of the hepatica and bloodroot. It is also known as the "snowy" or "dwarf trillium." The snowy part of its name probably refers to the snow-white blossoms but the precocious flowers are often snowy for other causes. The only other American genus included with *Trillium* when these plants are separated as a distinct family, is *Medeola*, whose one species is known as "cucumber-root." If one digs down at the base of this plant he will come to a short, crisp, conical white rootstock which is edible and whose flavor at once suggests the common name.

Few of the *Alliums* are valued for their flowers and but for more plebeian uses these plants would be little known. They are, however, close kin to the regal lily and are properly included here. The word "onion," by which most of the species are known, is an old term derived from the French *oignon* which is in turn derived from the Latin *unio* signi-

fying unity. The word "onion" signifying a large pearl is also derived from *unio* but the identical word, says the dictionary, may not have served for both derivations. "Garlic" is another ancient name from the Anglo-Saxon *gar* meaning a spear or lance, and *leac* the wild leek. The word, leek, itself, is found as a variant in many of the languages of central and northern Europe and the "gar-leek" was evidently only another kind of leek with round spearshaped leaves instead of the flat leaves of the common species. The "chives" (*Allium schoenoprasum*) is in like manner called "rush garlic." "Chives," it appears, comes from the French *cives*, supposed to have been derived from the Latin *Cepa*, the specific name of the common onion. "Cives," therefore, seems to be the better spelling of the name. *Allium vineale* is known as "field garlic" and "crow garlic." The latter name is unintelligible unless it denotes the worthless qualities of this plant.

Although practically all the lilyworts are perennials, there are very few that are evergreen and still fewer, in our climate that are woody. In fact, the genus *Smilax* contains all the representatives of the latter kind. From the circumstance that the stems of certain species are armed with prickles and remain green all winter, they are called "cat-briers" and green-briers." The common *Smilax rotundifolia* has accumulated the largest number of vernacular names. Of these "horse-brier," "wait-a-bit," and devil's hop-vine" are of obvious derivation. "Bamboo brier" apparently alludes to the similarity of the stem structure to that of some of the rattans which are occasionally known as bamboos. "Hungry-vine" possibly refers to the way in which the vines cover up other plants, though in view of such other names as "biscuit leaves," and "bread-and-butter," there may be a more appropriate

meaning which has escaped me. "Nigger-head" probably alludes to the round clusters of black fruit.

Smilax pseudo-China is known as "bull-brier" and "false China-root." The true "China-root," it may be said, is an Old World plant, also a species of *Smilax* (*S. China*). Several of the North American species, notably *S. Walteri*, *S. glauca*, and *S. pseudo-China* are known as "sarsaparilla," but none yield the drug familiarly known by that name. The drug is the rootstock of *S. officinalis* and *S. medica*, tropical members of the genus. The word "sarsaparilla" is reported to come from the Spanish *zarzaparilla* from *zarza*, a bramble, and *Parillo*, the name of the physician who discovered the virtues of the plants. *Smilax Walteri* is also known as "red-berried bamboo," and *S. lanceolata* now comes to market for decorative purposes under the name of "Jackson vine" with no obvious meaning. The name of "stretch-berry" is given to *S. bona-nox* because the pulp of the fruit is elastic. *Smilax glauca* is the "saw-brier.

Two herbaceous species of *Smilax* are known as "carrion-flowers." The most conspicuous is *S. herbacea*, one of the plant is also called "Jacob's ladder" in allusion to the graceful stems and leaves. The second species is not even vine-like and lacks tendrils as its specific name, *ecirrhata*, indicates.

OREGON WILLOWS

By R. V. BRADSHAW.

EUGENE, OREGON, the site of the State University, is located between two buttes. Skinner's Butte is situated directly on the north side of the city, the railroad being near

to its base. The Willamette River, which flows in a general northwest course, is not far from it on the north. The butte has a good automobile road which leads to the summit, where a fine view of the City, the Willamette Valley, and the Three Sisters—a trio of snowy peaks—can be had. Spencer's Butte, 2063 feet high, the prominent landmark of the locality, is about six miles south of Eugene. The crest of this is crowned by huge rocks on which can be found the lace fern. It is said that on a very clear day the Pacific Ocean can be traced in hazy outlines in the west. I might add here that besides several rare botanical specimens, I have collected an excellent representative of *Crotalus lucifer* on the summit.

Besides three cultivated willows, seven native species are to be found about Eugene. The three grown for ornament are the familiar weeping willow, crack willow, and goat willow. *Salix Scouleriana*, which the children call the pussy-willow, is the first of the wild ones to bloom. Although very abundant along the Willamette River, it can be seen growing around Spencer's Butte and other places in the woods afar from streams. The catkins come out long before the leaves. The pistillate aments are noted for the pubescent capsules. The scales are dark brown or black. The bark has a peculiar strong odor which to some is not pleasant. The leaves of this tree are not of the well-known type, but are very large and broad.

Salix Piperi comes out a little later; it is also popular with everyone and is much used for decoration. This is common along the streams and rivers and rarely very far from them. This also comes under the designation of pussy-willow, for the flowers come out ordinarily either before or with a few small leaves or leafy bracts. The twigs are a light golden brown and are very brittle. The ament scales are dark, but

the capsules are not pubescent. The leaves are rather silvery or light colored beneath.

The silky willow, *Salix sitchensis*, is a very beautiful shrub or tree on account of the leaves, which are very dark green above and covered with silky pubescence beneath. Although this species, in my estimation, is well worth knowing, it is rarely noticed as it does not belong to the pussy-willow type. It is more abundant along streams or rivers. The catkins are long and slender. The staminate have one stamen to a scale, the scales being light brown in color. The pistillate aments have pubescent capsules. After the silky willow, *Salix Mackenziana* begins to show its long pointed catkins, the bright red anthers at the tip of the ament contrasting well with the older yellow ones at the base. These flowers come out with the bright green leaves. The scales are light brown, and the capsules are smooth. Some of the leaves are cordate at the base, and are often glaucous beneath.

The gland willow, *Salix lasiandra* var. *Lyallii* is a very gorgeous species, but in spite of this it blooms quite unnoticed for most of the trees are leaved out and the other flowers are abundant. The common name is given on account of the glands where the petiole joins the blade. This species reaches the height of a tree and is common about sloughs and situations where the water stands on the ground part of the year. The tree is easily recognized from afar by the bark, which is furrowed longitudinally. There are five or more stamens to a scale, the scales being a light yellow in color. The capsules are smooth.

Nuttall, in his North American Silva, said of *Salix sessilifolia*:

"This beautiful and very distinct species of willow formed dense tufts on the rocky borders of the Oregon, at the con-

fluen^c of the Wahlamet, attaining to the height of about six to eight feet, and when in flower appeared as showy as a Mimosa." I quite agree with Nuttall, as to the appearance of this willow. The flowers come out with the leaves which are very soft to the touch—Nuttall likened them to velvet—and are made noticeable amid the surrounding river vegetation by the lemon-yellow catkins and the soft sage green color of the leaves. Later in the season—the species blooms in June or the latter part of May—the leaves lose much of the soft pubescence, but retain the peculiar color. This willow is very common about the Willamette River near Eugene.

The sandbar willow, *Salix melanopsis bolanderiana* is very similar to its near relative, the soft-leaved willow (*S. sessilifolia*), but is not so beautiful. The catkins are similar in shape and color, but the capsules are not as densely pubescent. The leaves lack that wonderful softness to the touch, and are often devoid of pubescence. This species is very common on the sandbars, and is very attractive in appearance in the winter, when the leaves are gone, due to the bright red or yellow color of the twigs of the slender bushes, which are not ashy as in the case of the soft-leaved willow.

The willows make very attractive herbarium specimens, when one has the leaves mounted on the cardboard with the catkins. They are especially beautiful, when the capsules are partly open and the seeds are escaping. But better than the dried specimens are the living willows themselves.

A REMINISCENCE OF ROSES

By S. B. PARISH

WELL do I remember the hawthorn hedge that shut in the privacy of an ancient mansion near the city which was my boyhood's home. It was the "Cockloft Hall," of some of Irving's earliest essays, and was a bit of rural England in architecture and surroundings. I must admit that the hedge was somewhat ragged and unthrifty, evidently unfitted to accommodate itself to this new world. But the eglantine, whose errant branches overhung the gateway arch, found itself quite at ease, content with its lot, and giving contentment to the passerby. How sweet the fragrance of its foliage, how delicate the pink beauty of its blossoms!

Later, in one of the Gulf States, I came to know the Cherokee rose, clambering over fences and trees by the roadsides, its masses of shining verdure set off with abundant bloom of purest white. It seemed a true American, so full was it of vigor, so impatient of restraint. One learned with surprise,—indeed, with a certain chagrin,—that it, too, was an immigrant, and an Asiatic at that. But it must have established itself at a very early period, for in 1803, Michaux had no suspicion of its foreign origin when he gave it its first botanical name, *Rosa laevigata*, and designated Georgia as its habitat. Thus, by the rules of botanical nomenclature, an American State becomes the "type locality" of a Chinese rose.

I have never again seen the eglantine, but some thirty odd years ago I renewed my acquaintance with the Cherokee rose, in a town in southern California, where I came upon it leaning from the coping of a retaining wall, which is quite concealed beneath its green luxuriance. It was then just be-

gining to make its appearance in California, but where it is now common in cultivation in many parts of the State, but does not escape as in the Gulf States.

I suppose I shal quite lose caste with rosarians when I confess my preference for the single roses over the choicest hybrids of the garden. Those favorites are indeed beauties, but a trifle over-dressed, a trifle rouged and enamaled. I like better the slender symmetry, the pure blush, of their maiden sisters, and it is by these graces that the wild roses attract me. Here in California they haunt the borders of brooks, of meadows and of copses, where moisture is to be found for their roots, and where they can spread in the sunshine their evanescent petals of delicate pink. When I first knew them we were content to count but four species for the whole State; but those were simple days. Now the activity of systematists has divided and sub-divided them, until the latest monographer is able to enumerate thirty. The trained taxonomist is not always successful in discriminating them, but the more fortunate gatherer of wild flowers may leave him to his puzzles and be happily content to call them all "Wild Roses."

TWO NEW SPECIES FROM ARIZONA

ERIOGONUM CLUTEI Rydberg, sp. nov.

Annual, stem $\frac{3}{4}$ dm. high, glabrous, glaucous, striate, somewhat fusiform-thickened below the nodes, di- or tri-chotomously branched, the lower nodes 5-10 cm. long; basal leaves petioled, the petioles 1-3 cm. long, the blades reniform, 1-1.5 cm. long, fully as broad, white-floccose on both sides, rather thick; stem-leaves verticillate, reduced to small scales, $\frac{1}{2}$ mm. long, lanceolate to broadly triangular; pedicels slender, 5-20

mm. long, erect, in the axils of the forks or racemosely arranged on the ultimate branches; involucra turbinate or obovate, 1-1.25 mm. long, about 0.75 mm. broad, glabrous, the lobes ovate, acute; perianth yellow, 2.5-3 mm. long, densely white-pilose without, the lobes lanceolate, acute; fruit unknown.

This is a member of the section PEDUNCULATA and most closely related to *Eriogonum Ordii* S. Wats. It agrees with the description of that species except in the following points: The perianth is yellow not white with pink tips, the hairs of the perianth are longer, and the leaf-blades are not tapering at the base.

Type collected at Cameron, in the driest part of the desert near Tuba, Arizona, July 15-31, 1920, *W. N. Clute* 71a (Herb. N. Y. Bot. Garden).

FORESTIERA ARIZONICA (A. Gray) Rydberg.

Forestiera nomericana arizonica A. Gray. Syn. Fl. 21:76. 1878.

This is a more stunted and thick-branched shrub than *F. neomericana*. The branches, leaves, and even the fruit is densely soft-pubescent when young. The leaves are broader, obovate rather than oblanceolate and short-petioled; in age they become glabrate; they are entire or crenulate and thicker than in *F. neomericana*. The fruit is comparatively shorter and thicker, about 6 mm. long and 4.5 mm. thick, in age glabrous and black. The pubescence of the twigs is more permanent, remaining throughout the first season. In the herbarium of the New York Botanical Garden, there are the following specimens:

ARIZONA: Prescott, 1876. *E. Palmer* 580 (duplicate of type, in flower); Desert near Tuba, July 15-31, 1920. *W. N. Clute* 118 (fruit).

NEW MEXICO: Lincoln, May 8-19, 1902, F. S. Earle 667.
(young fruit).

OWNERS OF COMPLETE SETS.

In view of the small number of complete sets of the *American Botanist* in existence, it is desirable that a list of the owners be made. Below we give the list as far as known. If therero are others who possess a full set, we should be glad' to have the information. To own a full set will soon be a mark of distinction.

- Bauman, Mrs. Adda, Pittsburg, Pa.
Burnham, Stewart H., Cornell University, Ithaca, N. Y.
Buswell, W. M., Fort Myers, Fla.
Case, Rev. B. F., East Granby, Conn.
Classen, Claus S., Chicago, Ill.
DeCleene, Rev. L. A. V., West DePere, Wis.
DeSelm, Hon. Arthur W., Kankake, Ill.
Fitzpatrick, Prof. T. J., Bethany, Nebr.
Jellett, Edw. C., Philadelphia, Pa.
Jenks, Chas. W., Bedford, Mas.
Johnson, Prof. Earl Lynd, Briggsdale, Colo.
Marsh, W. T., Amlin, Ohio.
Martin, Dr. Louisa, Chicago, Ill.
Plitt, Prof. Chas. C., Baltimore, Md.
Rhodes, Chas. O., Groton, N. Y.
Schaffner, Prof. John H., Columbus, Ohio.
Thompson, Prof. J. F., Richmond, Ind.
Tuttle, Mrs. J. D., Marlboro, N. H.
Vick, E. C., Newark, N. J.
White, Chas. E., Shelburne Falls, Mass.
Wolfgang, Harry G., Leetonia, Ohio.



NOTE *and* COMMENT



THE AMATEUR BOTANIST.—Till very recently, whole sciences, such as taxonomy and zoegeography, entomology and genetics were almost entirely in the hands of amateurs. Mendel was an amateur and all the wonderful varieties of our domestic animals and plants were developed, one might almost say, invented, by amateurs. The change which has come over the situation is due to the great increase in our knowledge in more recent times and the exuberant growth of our universities, technical schools, museums and research institutions. These have made investigation more and more difficult for the amateur, especially in the organic sciences and physiology which now demand an exacting preparation and elaborate apparatus, although there are even at the present time a few eminent amateur astronomers and geologists. Amateurs still abound, nevertheless, in zoology and botany, in which it is still possible to carry on much valuable research with very simple equipment. There must be thousands of them and nothing is more extraordinary than the ignorance of their work on the part of many of our university professionals. I could give a long list of men in the most diverse professions whose researches have greatly enriched entomology and other departments of zoology. In such vast and complicated sciences as biology and archeology the work of the amateur is so much needed and so worthy of encouragement that we may regard it as one of the greatest defects in our educational system that a youth is ever able to leave the science courses in a high school or college and take up the humblest calling without a fixed determination to fill at least a portion of this leisure hours with the joys of research.—*W. M. Wheeler in Science.*

EDUCATING WILD PLANTS.—Those who attempt to introduce wild plants into their gardens by means of seeds, often find it difficult to get the plants established in this way. Although they seem to grow well enough in their native haunts, they are slow to germinate in cultivation or fail to come up at all. It is likely that we unconsciously contribute to this failure by treating the seeds differently than they are treated in nature. For instance, we are likely to keep them in a dry room over winter when they are accustomed to lie in the cold and sodden ground through that season. It appears, however, that when wildflowers are introduced into cultivation and propagated by means of their seeds, the slowness to sprout wears off and thereafter they grow readily. Mrs. S. B. Walker writes that this is the case with *Gilia aggregata*, *Salvia grandiflora*, *Lepachys*, columbine and a number of others. The plants seem to become educated to the different conditions in which they are obliged to grow. A scientific explanation of the facts seems to be that only those seeds which can grow at all in such situations are likely to leave descendants and since children are like their parents, there is soon bred up from these a race of plants that is amenable to garden cultivation by the elimination of those less able to survive in such situations.

TAWNY DAY LILY.—The commonest member of the genus *Hemerocallis* in the United States is undoubtedly that reddish-yellow species known as the tawny day lily (*H. fulva*). It is the most aggressive of its clan, thoroughly satisfied with our soil and climate, and when thrown out of the garden for crowding, thrives on rubbish heaps and along roadsides. Notwithstanding its vigor and amiability, it is seldom held in high esteem by the gardener, but N. M. Grier has discovered a new characteristic which makes it worthy of attention. He finds that this plant rarely if ever sets seeds. After a num-

ber of experiments he has been unable to induce the plants to fruit at all. The sterility of the plant was hinted at as long ago as Sprengel's time, but it was then thought that this condition was due to the absence of the pollinating insect. This, however, appears not to be the case for numerous flowers were hand-pollinated, some with their own pollen and some with pollen from other flowers without effect. Linnaeus regarded this species and the lemon lily (*H. flava*) as two forms of a composite species but crosses between the two produced no progeny. It may be possible that in this plant we have another illustration of the fact that plants which spread by vegetative means often are slow to fruit. If any of our readers have seen this species with seeds, we hope to hear from them.

ADAPTATION TO ENVIRONMENT.—One of the premises upon which the theory of evolution rests, is that new forms originate through the adjustment of species to their environment. It may be pointed out, however, that just because a new form originates in a given region is no reason for assuming that it is better adjusted to that region than to any other. Our experience with weeds is an abundant daily refutation of the idea. A plant is primarily a weed when it thrives in a locality better than the natives do. It then invades cultivated grounds and vies with the rightful plants for possession. We know, however, of many species that in their native haunts are not particularly obnoxious but when taken abroad have grown with astonishing luxuriance. This clearly show that the new region better meets their needs than the one in which they originated. Plants, therefore, may often be better adapted to live in a remote region than in the one in which they are found native,

WITCH HAZEL GOES WEST.—One of the shrubs selected

for experiment in a series of acclimatization studies carried on by the Desert Botanical Laboratory in Arizona was the witch hazel (*Hamamelis Virginiana*.) This species has a reported range from Canada to Texas, blooming in autumn in northern regions and in early spring in the southern. It is likely that the southern plant is a different species, but this is not important in the present instance, since all the plants selected were from northern stock accustomed to blossoming from October to December. When transferred to Arizona, however, the plants bloomed in early July of about a hundred days after growth was resumed in spring. Seeds were ripe in January and February, whereas the fruits in New England require practically a full year to mature.

MULTIPLE NOMENCLATURE.—In flower nomenclature, botanists have been altogether too lavish in their terms to the great disgust of the teacher who finds it necessary to teach all of them to each pupil in order that they may be sure to get past the college professor who is committed to his own brand of names. When the pessimists begin to ask what is the matter with botany, it might be well to look into this phase of the matter. When the petals are entirely separate and distinct, the flower is often said to be polypetalous but the meaning of this word makes it inapplicable. It is from the Greek *polys* many and *petalon*, a leaf or petal. Another term used is eleutheropetalous which is from the Greek *eleutheros*, free, and *petalon*. The word is rather too long for this fast age and choripetalous has been suggested as a substitute for it. This is from the Greek *choris*, separate, and the word for petal and exactly expresses it. Still another word is dialypetalous, the first part of which comes from *dia*, asunder and *lyin*, to loose. A similar condition exists in the terminology of united petals. The old term monopetalous will not answer

for it is from the Greek *monos*, alone, and the word for petal. Sympetalous is somewhat nearer the mark for the first part of the word is the Greek *syn* meaning with, though this does not exactly express it. A closer approximation is embodied in gamopetalous, from the Greek *gamos* meaning a union or marriage, but none of the terms in use exactly indicates the situation. It may be noted, also, that gamophylloous and monophylloous are terms used to indicate the union of perianth segments. Polyphylloous, however, relates to leaves and not to flowers.

BRACHYSM IN MAIZE.—When a plant is smaller than the normal in all its parts we call it a dwarf, but when only certain parts are dwarfed a new term is necessary. O. F. Cook who studied instances of this kind in cotton, suggested the term brachysm for such departures from the normal. Good illustrations of brachysm are found in the races of bush beans, dwarf peas, bush squashes, etc, where the internodes alone are shortened. A recent addition to this list is a brachytic form of maize which is less than a third as tall as the ordinary forms, but still sports as many leaves. This form originated as a hybrid between Algerian pop-corn and a Chinese waxy variety. The usefulness of such a form for the western regions of dry soil and high winds is apparent. In appearance the new form greatly resembles the Hopi corn so commonly cultivated by the pueblo Indians of the southwest. This latter variety is so short that the ears are often halfburied in the sand in which the plant grows. The writer has seen full-sized ears on plants of this kind less than two feet high. Crosses between the Hopi corn and the new form did not give encouraging varieties, but crossed with normal forms some of the progeny were brachytic and these give promise of developing

into useful strains. The form is discussed in Bulletin 925 of the United States Department of Agriculture.

A NEW FORM OF DENTARIA.—About five years ago, Mr. B O. Wolden of Wallingford, Iowa, sent us living specimens of a curious form of toothwort (*Dentaria laciniata*) which had two sets of stem leaves instead of the usual single whorl. This year the form has fruited in our grounds and proves to be very much like the common form with the exception noted. This double set of stem leaves appears to be constant and since new species in this genus have been made on much smaller differences in leaves, it appears desirable to give this form at least a varietal name. It is here proposed to call it *Dentaria laciniata var. dichronum*. The root leaves and stem leaves are similar, those of the lower whorl being rather broader than in the common form. They are borne on petioles four inches or more long which arise from the stem about two inches from the ground. The second whorl of stem leaves is located midway between the lower leaves and the flower-cluster. They are on petioles about an inch long and similar in appearance to the lower leaves though somewhat smaller. Those who prefer to call this a species would name it *Dentaria dichronum*, the specific name alluding to the two shades afforded by the two sets of leaves. The plant is reported to be fairly common about the type locality, Wallingford, Iowa.

RHUBARB LEAVES POISONOUS.—The common pie-plant or rhubarb (*Rheum rhaboticum*) of our gardens so universally used as the basis for pies and sauces in early spring is reported to contain a certain percentage of the deadly poisonous oxalic acid. It has long been assumed that this acid was present in the stalks along with malic and citric acids, but it does not occur here in quantities that make it harmful. In the blades of the leaves, however, the acid is reported to be twice as abun-

dant; in fact, it is sufficiently plentiful to make the use of the leaves a pot-herb decidedly dangerous. Numerous cases of poisoning have been reported from this cause. The poison is said to act by depriving the blood of its protecting calcium. In cooking, the acid may be neutralized by the addition of small quantities of calcium carbonate, that is, of ordinary limestone. It is likely that in regions where the water is "hard" it contains enough calcium carbonate to render any part of the plant harmless, but it is just as well to discard the leaf-blades. The leaf-stalks or petioles are never poisonous.

GOAT-WEED IN IDAHO—In the early '60's a hardy adventurer from New York State pushed his way westward toward the Oregon Trail. Finding the valley of the Snake River to his liking, he tarried a while and finally established a stock ranch in a fertile meadow where a little creek empties into the Blackfoot River. Having built a cabin he went back and brought his bride from the Catskills. She missed the familiar garden flowers of her childhood days and sent back for roots and seeds from her grandmother's garden. Many of these failed to grow in the new environment, but hollyhocks, mallows, ox-eye daisies, and the goatweed (*Aegopodium podagraria*) thrived and spread until the garden was a wonder in the wilderness. Later the Blackfoot Indians took the war-path and frightened away the ranchers, driving off the stock and burning the buildings. The buildings were never rebuilt and the wonderful garden soon disappeared, but the ox-eye daisies still bloom along the creek and the goatweed found refuge among the sage-brush where it can still be found. The original gardener still lives in a ranch up the valley and goes every June to pick "grandmother's border plant." This year one of the granddaughters sent me a fragment with a request for its name.—*Mrs. M. E. Soth, Pocatello, Idaho.*

PELORIA IN VIOLETS—Everybody knows that in normal violet flowers, the lower petal is spurred. When peloric flowers occur this "irregular" flower may be made "regular" by each petal producing a spur. A writer in *Torreya* records a plant of *Viola primulaefolia* with flowers of this nature, which was found on the bank of a stream at West Raleigh, North Carolina, in 1912. This plant was removed to a more suitable location for study and has since formed a considerable colony all of which bear peloric flowers. Seeds from the original plant produced new plants with the characteristics of the parent, thus giving additional evidence that such plants may breed true and that a race of peloric plants may thus be established. A curious feature of the abnormal flowers is that they are mostly 4-parted instead of having five parts in a whorl as orthodox violets do. Many of the flowers, however, failed of complete peloria and there was noticed a considerable irregularity in the number of parts in a whorl.

THE ARCTIC TUNDRA.—The polar margin of North American vegetation is characterized, as in other continents, by the treeless tundra. In Alaska the tundra occupies a narrow strip along the Bering Sea, and on the northern coast it covers the polar slopes of the northernmost branch of the Rocky Mountains. From the Mackenzie river eastward, its southern limit strikes inland across the lake region to reach Hudson Bay at Fort Churchill. The specific feature of the American tundra as compared with those of Siberia and Greenland is the wealth and extent of its lichen carpets. Though the ling heath is entirely absent from America, other species of the heather family are numerous, and in the tundra or barrens their dwarf bushes are preponderating. Among them occur evergreen *Rhododendron*, *Kalmia*, *Ledum*, bearberry and other bushes of a similar character, clad with lichens.

The well-known bloom-mats carpeting the southern slopes of many of the hills and knolls, like islands or oases of beauty, are said to reach their best development in Alaska.—*M. E. Hardy in "Geography of Plants."*

SURNAMES FROM PLANTS.—Time was when men had no surnames. When the crowd of Johns and Bills and Henrys became too numerous to be designated accurately by a single cognomen another was added which finally became the family name. People do not seem to have been very particular about their surnames and a study of the names they have assumed is full of interest. Of such names derived from plants we have Berry, Budd, Bush, Corne, Flower, Plant, Pollard, Rice, Root, Seed, Thorn, Wood, Ash, Broome, Brummel, Coling, Crabtree, Gale, Gribble, Hawthorn, Hawtree, Hay, Hollins, Holme, May, Oakes, Rose, Snoakes, Snooks, Rowan, Akers, Cherry, Crabbe, Coine, Fraser, Hague, Haigh, Merry, Boone, Bennett, Cockle, Cole, Couch, Darnell, Drew, Emery, Fern, Fitch, Grass, Heath, Lavender, Lever, Lilly, Moss, Oates, Ramsey, Reed, Rush, Spiers, Ware, Woodruff and Pettigrew. This list is probably far from complete and we would be glad to have our attention called to any we have missed.

Poisonous Lima Beans.—A number of leguminous plants are possessed of poisonous properties and among them are certain varieties of the common lima or butter-bean (*Phaseolus lunatus*). Those most likely to be poisonous are forms known as Burma, Java, Rangon or Burmania beans. The varieties grown so extensively in California and elsewhere for food are harmless but others have a poisonous glucoside which by hydrolysis produces hydrocyanic acid. As usual the wild varieties are most poisonous.

Hawthorn or Thornapple.—In a recent issue of *The American Botanist* you ask for data as to the use of the names

"haw," "hawthorn," and "thorn-apple." Mr. Cooper says that thorn-apple is the name here, (New York), but that "haw" was used in southern Iowa, where he resided for a time. My own home is in Worcester, central Massachusetts. There, "thorn apple" is the only term in common use, I am positive. I might add that while, as a child in Worcester, I played with children of English families, and have since known English grown-ups, I cannot recollect hearing any of them use "hawthorn" except for the cultivated shrubs, just as the rest of us do.—*Arthur C. Nutt.* [This appears to strengthen the theory that in the Eastern States "thorn-apple" has the preference as the common name of *crataegus*, but that in the Middle West this is shortened to "haw." Further observations are requested.—ED.]

CAULIFLORY IN RED-BUD.—It is rare, in northern regions, to find woody plants producing flowers from the old wood. Soon after the twigs are formed they are covered with a layer of protecting bark which ordinarily buries the underlying tissues so deep that flowering from them is out of the question. In tropical regions, however, especially in the rain forest, the trees do not need such thick bark and the production of flowers from the trunk and larger branches, or cauliflory, as it is called, is a common occurrence. The chocolate plant (*Theobroma cacao*) produces most of its flowers in this way. The only plant in northern regions with this habit seems to be the redbud (*Cercis canadensis*) which rivals the wild crab and dogwood in beauty during the blooming season. Immense numbers of pink pea-shaped flowers are borne on the twigs and branches, in some cases on branches at least six years old. All our other shrubs either produce flowers from the wood of the preceding year or from twigs that are not formed until after the growing season begins.



EDITORIAL



The delay in the appearance of this number has been occasioned by a strike of the printers in the office from which it is issued. At a time when all branches of industry find it imperative to reduce costs and increase output, the printers generally have attempted to shorten their hours of labor and advance their wages. Although we are not pecuniarily interested in the present controversy, having a contract made before the matter at issue came up, we are not in sympathy with the efforts of any group of workers to hold up the public simply because they happen to have the power to do so, and have been willing to wait in the expectation that this latest holdup will be defeated. We trust that our subscribers are of the same mind. The slacker policy prevalent in this country of reducing production and increasing wages may appear at first glance to be desirable as making more work and better incomes for everybody, but in the long run it can only result in harder times and the loss of desirable markets. Many printers are now paid more than \$200 a month which fact alone shows why books and magazines are so expensive. The refusal of employing printers to co-operate in further advancing costs may cause a temporary inconvenience to readers, but it is time that printing prices took a downward turn and we believe that every move in this direction should be encouraged.

* * *

Farmers in many parts of our country are asking permission to take in part of the roadsides on the plea that much land is wasted on which they grow additional crops. To such

people the birds, the wild-flowers, the sheltering trees, and the wild things that scurry from one thicket to another are not to be considered in comparison with another row of corn or a few more square yards of wheat or oats. A carefully barbered roadside bordered by a neat line of barbed wire fence is apparently their idea of perfection. There are others, however, who hold no such opinions. The traveller, whether on foot or by more rapid means of conveyance, regards the unkempt waysides with an indulgent eye and values them in direct proportion to their raggedness. The preservation of our roadsides in some semblance of their original condition is regarded of so much importance that the American Association for the Advancement of Science at the recent meeting in Chicago adopted a resolution giving support to the movement for the preservation of our unprotected wild life and protesting the clearing up of the roadsides. This movement should have the active support of all botanists and other lovers of nature.

* * *

Recent demands upon our stock of back numbers has brought it close to the vanishing point. There are only about 25 full sets left and seven more are complete from volume 1 to 22 inclusive. Volumes 23 to 27 are already out of print except in full sets. Those who have partial sets of the early numbers cannot hope to complete them, but those who have the later issues, may still have a full set if the early numbers are ordered soon. We have various odd volumes earlier than volume 22 with which we can fill sets while they last.

BOOKS AND WRITERS

A new "Dictionary of Scientific Terms" by J. F. and W. D. Henderson has been received from the D. Van Nostrand Company of New York. This work aims to define the technical terms relating to the sciences in general with which the reference to botany, zoology, physiology and anatomy. These terms, it may be said, are not those used in taxonomy nor yet those found in the ordinary dictionary but are the strictly technical terms relating to the sciences in general with which the scientist may be unfamiliar. In addition to being defined, each word is pronounced, its derivation given and the science to which it refers indicated. We note the use of a diacritical mark to indicate a variation, we assume, in the pronunciation of certain terms though no reference is made to it, in the table of sound symbols employed. The book was made in England and naturally reflects the British viewpoint. Fertilization and pollination are not as carefully distinguished as they are in America and the spelling of various words is different as for instance *caespitose* where we write *cespitoso*. Both ecology and oecology are given and rosaceous is defined but liliaceous is not. Halophytes are included but oxalophytes have been overlooked. Monocotyledons and dicotyledons are, of course, defined, but the shortened forms monocotyl, dicot, etc. are not noticed. The derivation of the words appear to have been very carefully traced. In this connection it may be noted that one is not warranted in assuming that two different words are derived from the same root because they have a similar sound. The first part of the word triangular comes from the Greek *tria*, but the same syllable in triarticulate is from the Latin *tres*. The defects noted in the book are not such as to impair its usefulness and these will doubtless be corrected in

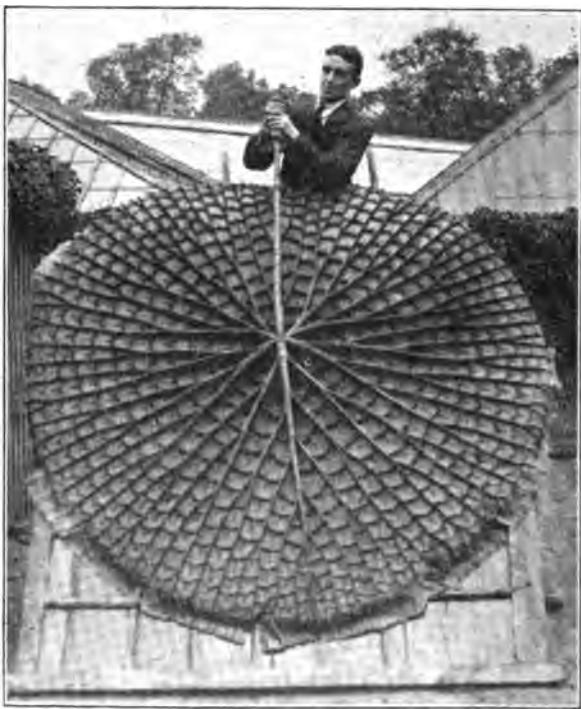
succeeding editions. A careful study of the volume is recommended to teachers. They will learn that in hybrid and hybridize the *y* has the sound of eye, that gamete is accented on the last syllable, and rhizome on the first and that both *megas* and *makros* may mean large in such words as marospore and megasporophyll. Dictionaries of this kind are not as yet common and it is likely that this volume will find a warm welcome. The price is \$4.50 net.

Although called a "Geography of Plants" a recent book by A. S. Hardy would better be named "The Plants of Geography." Those who take up this book in the expectation of finding the distribution of any plant or group of plants given are due to be disappointed. The book is in fact, not so much an account of plant distribution as it is a description of the surface of the earth with a rather general account of the plants that inhabit each physiographic area. These areas, moreover, are described without much reference to a central theme so that the work fails to make a coherent series. The geographical training of the author is evident in the use of a multitude of terms that in themselves do not indicate whether they refer to mountains, lakes, plains or deserts. Frequently the terms used in discussing the vegetation will be equally unintelligible to the general reader as for example, catinga, garigue, nyika, selva restinga, taiga, scree, punyas, etc. One may, indeed, find in this book, whether a given part of the world is covered with forest, scrub, grassland or the like and in a general way what kind of plants occur, but it appears to be far from a geography of plants. The book is published in England by the Oxford University Press whose office on this side is at 35 West 32d St., New York. It is a 12mo.

"The Music of Wildflowers" is the title selected by John Vaughan, Canon of Winchester, for a collection of botanical

papers reprinted from various British magazines. As might be expected from one of Canon Vaughan's eminence, the essays are not simply recitations of collecting experiences, but rise to the dignity of good literature in which even the general reader finds much of interest. In the first paper, which gives title to the book, and is based on the statement of Dr. Arnold of Rugby that "Wildflowers are my music," one discovers that many Englishmen, noted in very different walks of life, have been ardent botanists. The list includes Dr. Arnold, John Stuart Mill, the poet Clare, Matthew Arnold, Charles Kingsley, George Crabbe, Gray of the "Elegy," and Alfred Tennyson. Crabbe, in fact, wrote a work on botany but because the Vice-master of Trinity College could not tolerate the idea of "degrading the science of botany by treating it in a modern language" Crabbe threw it into the fire. A majority of the essays are concerned with the flora of Suffolk, the country of Gilbert White of "Selbourne" fame and of Izaak Walton the Angler. Two papers "On Selborne Common" and "Where Izaak Walton Died" place these worthies in a new light. Walton, in fact, died in the Cathedral Close at Winchester. As a general thing, English essays dealing with out-door subjects have more style and finish and more literary excellence, than we commonly find in American writings of like nature and the present volume is a good illustration of the fact. It is published by E. P. Dutton & Co., 681 Fifth Ave. N. Y.





LEAF OF VICTORIA REGIA

THE AMERICAN BOTANIST

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*I have a garden of prouder claims,
Full of novelties, bright and rare,
Modern flowers with stately names
Flaunt their wondrous beauty there;
Yet in threading its brilliant maze,
Oft my heart, with a homesick thrill
Whispers, dreaming of early days,
"Grandmother's garden was fairer still."*

—Elizabeth Akers.

THE VICTORIA WATER LILY

By WILLARD N. CLUTE.

THE greatest of all water lilies, *Victoria regia*, has been so frequently written about that the name at least is familiar to nearly everybody, but the plant, itself, is still so rare in cultivation as to present several unusual features. Through the kindness of the Secretary of the Royal Botanic Society of London we are able to present as a frontispiece a photograph of the underside of one of the great leaves taken from a plant growing in the Society's garden. The following account is from the Society's *Quarterly Summary*:

"The *Victoria regia* in the gardens has done very well this year. It has had nine to twelve leaves of six or seven feet in diameter at one time and the plant has shown no signs of the disease which sometimes spoils the leaves.

"The opportunity was taken when the tank was getting crowded, to cut and lift a leaf out intact and reverse it so as to show the underside. The upper side of the leaf has often

been figured and most people are familiar with its appearance, but no illustrations that I can find have ever been made of the reverse side. The reason is the difficulty of lifting from the water and turning over so large a leaf—whose substance is no thicker than paper and besides is armed with needlelike spines—without breaking it. The photograph shows particularly well the unique mechanism whereby the leaf gets its extreme buoyancy and also the strength which enables it to keep rigid in so unstable a medium as water. It has been stated that Sir Joseph Paxton, the designer of the Crystal Palace, got his idea from the study of the structure of this leaf, with which, as gardener at Chatsworth—almost the first place the plant was grown after its introduction—he was of course well acquainted.

"Spruce the botanist who travelled in Central America in 1849 and saw the plant growing in its native waters said that 'the leaf when turned up suggested some strange fabric of cast-iron just taken out of the furnace; its color and the enormous ribs with which it is strengthened increased the similarity.' The ribs which radiate from center to circumference, though hollow have a depth of 4 to 5 inches at the center and with the septae divide the whole of the under surface into a series of chambers, air tight when the leaf is in the water. As the leaf exhales air through the stomata on the under side it is caught in these chambers, pushing the water down just as the contained air does in a diving bell. The air chambers give the leaf a buoyancy more than twenty times greater than it would have without them and as the leaf is able to increase or diminish the supply of air it follows that it can control its buoyancy. How great a weight a leaf can support was proved by the late Mr. W. Sowerby, who was Secretary at the time. Placing a sheet of zinc to cover the

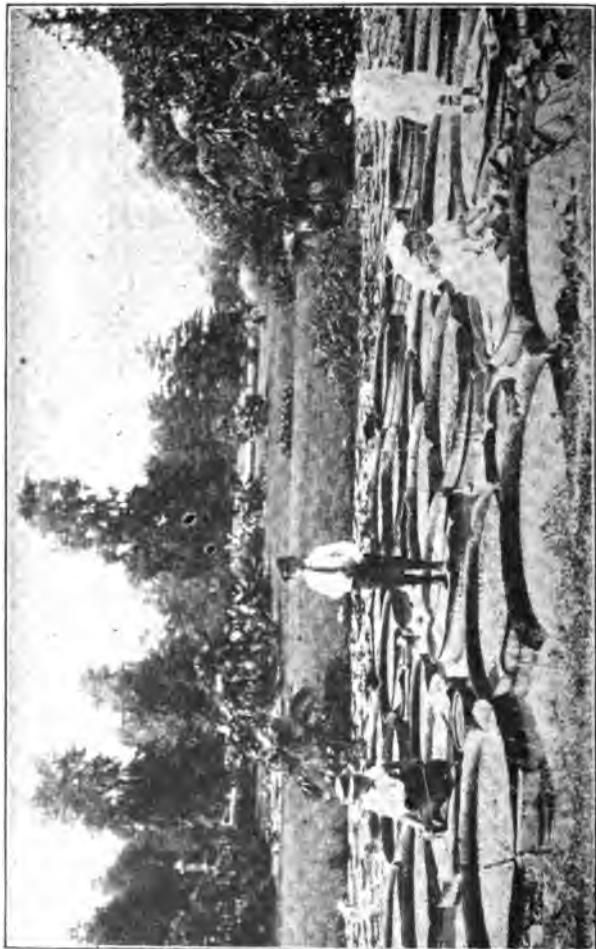
surface of the leaf, he poured sand upon it, distributing the weight equally, and it was not until 400 pounds, equivalent to the weight of three grown men had been deposited upon it, that the leaf sank.

"A most remarkable peculiarity about the under surface of the leaf is the way in which it is covered with long, sharp spines—some of them more than an inch in length. As the upper surface is without them it goes to show that whatever it is that it needs protection against, is something which attacks under water. It is scarcely likely to be fish for fish of the size to do damage would hardly live upon green stuff. But in its own river, the Amazon, we find an animal of the order Sirenia known as the Manati (*Manatus inunguis*) and this species, peculiar to the Amazon and its lagoons and tributaries, feeds exclusively upon aquatic plants from underneath the water. It is a seal-like animal 7 to 8 feet long with paddles for fore limbs and was once very common. It has a peculiar method of feeding; the long upper lip is slit vertically into two finger-like halves and these act as nippers, pinching off and pushing into the mouth the water plants on which it lives. The skin of the body is thick but that of the lips is thin and there can be little, doubt but that the plant evolved the spines to protect itself against the Manati or similar enemies with tender mouths."

To the foregoing account we add some notes on this species from *The American Botanist* for May 1917. Since the volume from which they are taken is now out of print they may prove worth reprinting.

Probably the most gigantic leaves in the world are those of the great water lily, *Victoria regia*, which grows in the quiet waters of northern Brazil and Guiana. Paul Marcoy an early traveller claims to have measured some that were more

THE GIANT WATER-LILY.—*Victoria regia*



than twenty-four feet in circumference. In temperate regions where the plant may be grown in warm pools, the leaves are much smaller but even then may reach a diameter of three or four feet. An interesting peculiarity about them is the fact that the edges are turned up for several inches all around, the leaves thus presenting the appearance of large shallow pans. The turned-up edges serve a practical purpose and keep the upper surface of the leaves from getting wet.

Although old leaves are so frequently pictured quite circular, the first leaves are narrow and elongated; the next are heart-shaped like ordinary water lily leaves and only the older ones are peltate with the petiole in the center. Even in the old leaves a distinct line shows where the lobes of the leaves have been joined. Leaves of this kind are strong enough to support the weight of good-sized children. In their tropical home the great leaves form an almost impassable barrier to navigation. Tropical birds are said to wander over them in large companies, searching for food.

The flowers, in keeping with the size of the leaves, are often more than four feet in circumference. Usually they are somewhat smaller, but blossoms with a diameter of a foot are common. The plant rarely flowers in the Temperate zone but may be induced to do so by keeping it at the proper temperature. It appears to have first flowered outside the tropics at Philadelphia. The blossoms are like those of the common water lily in shape. Outside they are a pure white, shading to a pink within.

The group to which *Victoria regia* belongs is not a large one, but it contains a number of interesting plants. The American lotus (*Nelumbium luteum*) has much in common with its relative of the Amazon. Like it the leaves are circular with the petiole in the center and the flowers are often

as large as a quart bowl. The pink species so often cultivated in parks is the Egyptian lotus (*N. speciosum*) and is said to be the only other member of the genus.

The water lily family (Nymphaeaceae) has always been something of a puzzle to botanists. It is ordinarily regarded as Dicotyledonous but some, on account on the structure of the plant, favor transferring it to the Monocotyledons. In most books it holds a place low in the scale of classification being assigned to the Ranales which includes besides the type family Ranunculaceae, the Magnoliaceae, the Berberidaceae, the Calycanthaceae and several others. A more than passing resemblance may be found in the blossoms of the whole group. This is especially striking in the flowers of the peony, the mandrake, the magnolia and the calycanthus.

EARTH STARS

BY MARY EARLE HARDY

SOME one has said we may know the patterns which Nature likes best by noting those she uses most. Did you ever think how often the pattern of stars is repeated? Altho so often used, there is always diversity,—from the stars that twinkle in the sky to the star flowers of spring and summer, the asters of autumn, and the snowflakes of winter; beside the multitudes of other stars on land and even in the sea.

I wonder how many of you ever saw the interesting earth-stars or *Geasters* as science calls them. The books tell us that while they are not uncommon, they are only seen by the most observing and by them are but little understood. Earth-stars have been called "the most picturesque of the mushrooms." They are little glorified puff-balls, and are of

especial interest to Nature-lovers because of their beauty and their singular habits. When growing they are fastened firmly in the earth by multitudes of fine thread-like growths known as the mycelium and look like the ordinary puff-balls, commonly known as "devil's snuff-boxes." The little ball which holds the spores is covered by a double covering, the outer one thick and leathery,—the inner one fine as silk. In the fall the tough outer covering separates into star-like segments, and the seven or nine or even twenty rays turn back like the petals of a flower, lifting the plant from the ground. The silken pouch which looks most like a puffy little cushion, breaks open at the top and the earth-star starts upon its great adventure—traveling and sowing its spores.

It is a fair weather traveler, however, and chooses a bright day to begin its journeys. In fact, it only travels on bright days. At night, or during rains, or when the air is damp the prudent little earth-star spreads out its rays flat upon the ground; their underside becomes glutinous, holding firmly to the earth. So the prudent traveler camps and waits for fair weather. How did the wise little plant learn that dampness would hinder the sowing of its spores?

As soon as the air clears the star-like segments lift from the ground, their gelatinous lining hardens, and the stars give themselves again to the wind, which tumbles them this way and that, scattering and planting their multitude of spores.

There are many varieties of Earth-Stars or Geasters, and they range in size from the fraction of an inch to two or three inches in diameter. In color they are much like the sand or earth in which they grow and over which they are blown, and this accounts, in a measure, for their being so seldom seen; but those who know them admire them for their singular beauty and marvel at their life-story.

PLANT NAMES AND THEIR MEANINGS--VIII

LILIACEAE—III

BY WILLARD N. CLUTE

THE fame of the lily-of-the-valley (*Convallaria majalis*) is so widespread that the plant is almost universally referred to by the name we here use. There are a few other names, however, that are scarcely appropriate and probably belong to that large class of book names that are rarely used except in print. "Mayflower" is not distinctive in a region where May is the flowery month and "May lily" is no better. "Wood lily" is more properly applied to the true lilies and "Conval lily" is merely an attempt to translate the generic name. In much the same way that chrysanthemums are known in the florists trade as "mums", the flowers of the present species are called "valleys."

Although the lily-of-the-valley is believed to be native to some parts of our country, its reputation for being a denizen of gardens is so fixed in the popular mind that other flowers are referred to as "wild lilies-of-the-valley." The one most commonly so named is *Mainthemum canadense*. This species has leaves very similar in appearance to those of the garden plant and its habit of growing in colonies adds to the resemblance. Although it normally bears two leaves, the generic name of *Unifolium*, sometimes given it, means "one-leaf" and the plant is also known as "one-blade". The fruits are tiny red berries and from this circumstance the plant is known late in the summer as "ruby bead." The term "cow-slip" applied to the plant is meaningless and doubtless indi-

cates a careless bibliographer. The relationship of *Maianthemum* to the group commonly known as "Solomon's seals" is obvious enough to gain for it the name of "two-leaved Solomon's seal" and this is probably its best known vernacular name. It was formerly included in the genus *Smilacina* which contain other plants named for Solomon and his seal. Upon the authority of its scientific name, this is the true May-flower but it appears to be rarely, if ever, so designated.

The true "Solomon's seals" belong to the genus *Polygonatum*. They derive their most familiar common names from the seal-like impressions on the root-stock left by the decay of the aerial stems. The name was first given to the European *Polygonatum multiflorum* at a time when a belief in the supernatural agency of many plant markings was strong. Our two species are often known as "sealworts." The Old World species is sometimes known as "David's harp" in allusion to an ancient musical instrument with a curved frame strung with bells. The "false Solomon's seals" have the same seal-like markings on their rootstocks, but they are less distinct, and since the flowers have separate perianth segments while those in *Polygonatum* are united, the "false Solomon's seals" are placed in the genus *Smilacina*. The commonest species (*S. racemosa*) is almost universally called "wild spikenard." It is not, however, very closely related to the plant reputed to be the real spikenard. "Golden seal" is doubtless due to some ignorant plant collector in whose ears all plant names ending in seal were one and the same thing. The name of "zig-zag Solomon's seal" refers to the arrangement of the leaves on the stem. The bright red berries have probably given the plant its common name of "Job's tears" though one of the grasses (*Coix lacryma-jobi*) seems to have the preference in this lachrymal contest if we may judge by

the specific name. The "star-flowered" or "starry Solomon's seal" is the only other species to have a common name. It is also known as "false Solomon's seal." All the plants named "Solomon's seal" have the peculiarity when growing in colonies of bending their stems in the same direction, with a noticeable ladder-like arrangement of the leaves, but they seem to have escaped the appellation of "Jacob's ladder."

The plants of one lily-like genus are known as "bellworts" from their drooping yellow flowers. The most conspicuous is *Uvularia grandiflora* with large pendant bells of pale yellow in which the perianth segments are more or less twisted. The names of "straw lily" and "straw flower" are not inappropriate. Another species, *U. sessilifolia*, is known as wild oats, the name probably referring to the color of the flower, though this or any other part of the plant has only the remotest resemblance to oats. The idea persists, however, for the same name is often bestowed upon *U. perfoliata* though this latter species is more frequently known as the "mealy bellwort" from the fact that the interior of the perianth is sprinkled with shining yellow grains. The name "straw bell" is appropriate enough but "Mohawk weed" is a puzzle. Possibly some early chronicler confused this species with a different plant used by the Indians. Members of the genera *Disporum* and *Streptopus* are often confused with these plants when not in bloom. Some of them, though fairly common, have no common names in the vernacular though they may have in the books. Species of both genera are sometimes called "twisted stalk" in allusion to the bent pedicels, and they also bear the name of "liver berry" though it is not clear whether the name refers to the fruits, which are not liver colored, or to some reputed medicinal virtue of the plants themselves.

Occupying much the same habitat as the bellworts are found two species of *Clintonia*. The name most frequently used for *Clintonia borealis* is simply "Clintonia", but others are sometimes heard, such as "wild lily-of-the-valley," the form of the plant suggesting the name. The slender flower stalk, rising from the rosette of rather broad, smooth leaves, accounts for such names as "cow tongue" and "bear tongue." "Heal-all" refers to its entirely mythical medical properties. This latter name is sometimes applied to an orchid with leaves of much the same shape and may have been transferred from that species. The name of "dog-berry" refers to the attractive, but inedible bluish-black fruits. The black fruits of *Clintonia umbellulata* have earned for it the name of "dog plum," the prefix, as ever, indicating worthless qualities. This latter species is often known as "white clintonia" to distinguish it from the more common species with yellow flowers. "Wild corn," applied to the white species, is unintelligible.

In old gardens and along roadsides to which it has escaped one may often come upon little colonies of the "star of Bethlehem" (*Ornithogalum umbellatum*.) It is a mystery why this plant is cultivated at all for the flowers are small, are green on the outside, have a short blooming season and remain open for only a part of the day. Perhaps its disposition to fend for itself explains its presence in many places where it is not especially desired. Insignificant as it is, however, its star-shaped flowers have become associated with the Nativity in its best known common name. It is also known as "star flower" and "summer snowflake." The fact that it closes at mid-day is echoed in such names as "nap-at-noon," "sleepy-Dick" and "ten-o'clock-lady."

The only lilywort in our flora to bear the name of hyacinth is *Camassia esculenta*. Among frontiersmen, how-

ever, this plant is more likely to be known as "camass" from the Indian term *quamass* applied to the edible bulbs. The "grape hyacinths" are by birth natives of Europe but they have become naturalized in some parts of our country. The commonest is *Muscaris botryoides* whose specific name, as well as the customary common one, alludes to the clusters of tiny, roundish, almost closed bells like a cluster of grapes. From the flower, also, come such names as "blue-bells" and "blue-bottle." The flowers of *M. racemosa* are also known as "grape hyacinths", "starch hyacinth" and "pearls of Spain." It is probable that starch has been made from this plant as it has from so many other plants with underground storage organs. In connection with the last name it may be recalled that pearl was originally a term for an onion-bulb and this probably explains the vernacular name.

The species of *yucca* are the only lilyworts that share with the smilaxes the quality of being evergreen. When the plants are not known simply as "yuccas" they are usually called "Spanish dagger" or "Spanish bayonet" in allusion to the stiff leaves which in many species terminate in a point of needlelike sharpness. *Yucca baccata* has an edible fruit which the Indians of the Southwest call "hosh kawn." Some of the yuccas have long whitish filaments along the edges of the leaves which cause them to be known as "bear's thread," "Adam's needle," "Eve's darning needle" and "silk grass." Both *yucca glauca* and *Y. filamentosa* are called "bear grass" though so far as known bears have no connection with them. Perhaps the name was originally *bare* grass from its habit of growing in barren places. *Yucca glauca* is well called the "soap-weed" for the rootstock has only to be crushed to yield a fine substitute for soap. In certain ceremonies of the Indians it is always so used. This species is also known as

"palmillo" or little palm though it has only a superficial resemblance to the palms.

Although the specific name of *Veratrum viride* signifies green it is commonly called "American white hellebore." The real "white hellebore" is a European plant but it may be said that neither species has anything in common with the true hellebore except the name. The latter is a member of the Ranunculaceae. Our plant is also called "green hellebore," "false hellebore" and "swamp hellebore" in reference to its poisonous properties and it is possible that "devil's bite" and "poor Annie" may belong to the same category. "Indian poke" and "poke-root" given to our plant are both applied to another poisonous species, *Phytolacca decandra*, which is not closely related to it. "Earth gall" may be still another reference to its harmful nature but "itch-weed" and "tickle-weed" are posers since in medical practice the drug is administered internally for its effect on the heart. Among the vernacular names for this plant in the books, we find "puppet root." This very nicely illustrates the carelessness of writers in cataloguing such names. In former days, the root of the Old World mandrake (*Mandragora*) was carved into the rude resemblance of a man (*puppet*) and used as a talisman to ward off disease. Ignorance or carelessness has first passed the name on to the hellebore and finally associated it with our plant.

Veratrum is not the only genus in the Liliaceae that is reputed to possess poisonous properties. *Amianthium muscaetoxicum* as its specific name suggests, is called "fly-poison," "crow poison" and "hellebore." *Stenanthium gramineum* is the "Death camass" and "hog potato," the latter name indicating undesirable properties. Several plants of the bunch-flower group are known as "false asphodels," notably

Tofieldia palustris and *T. glutinosa*. *Narthecium Americanum* is the "bog asphodel" while the specific name of *Xerophyllum asphodeloides* again refers to the name. Since nothing is definitely known about the asphodel of the poets it is as well to call these plants false asphodels as any. It may be added in passing that some assert that the original asphodel was the poet's narcissus (*Narcissus poeticus*) and that the common tongue has since changed asphodel first to "affodil" and then to "daffodil." The asphodel of the poets is always connected with death. It was reputed to grow on the confines of the infernal regions and was probably among the flowers let fall by Proserpine during her memorable encounter with Pluto. The bright yellow blossoms and grass-like leaves of *Narthecium Americanum* have given it the name of "yellow grass" while its fondness for moors accounts for "moor grass." "Rosa solis," applied to this species, seems to have no special significance. *Xerophyllum asphodeloides* is commonly known as "turkey-beard" from its feathery panicles of bloom.

One of the best known vernacular names of *Chamaenerium luteum* is "blazing star," though how this character can be read into the pale yellow blossoms is a mystery. The name of "drooping starwort" has reference to the nodding tips of the unopened raceme. After "blazing star," "Devil's bit" is perhaps the commonest common name. The reference is to the root which has the form known as premorse, that is, it appears as if bitten off. In the Old World the "scabious" (*Scabiosa*) is given this name. The legend is that the plant was one of marvellous medicinal properties residing largely in the root. Out of spite the devil is said to have bitten off the tip of the root to impair its healing properties. The names "Unicorn root" and "unicorn plant," doubtless refer to the root also.

The medicinal virtues of *Aletris farinosa*, albeit they are no longer acknowledged by the Pharmacopeia, have given it a number of names such as "colic root," "ague root," "ague grass," "bitter grass," "bitter plant" and "aloe root." The plant is called "stargrass" and "blazing star" with no more propriety than when these names were bestowed on *Chamaenerium*. "Unicorn root" and "unicorn horn" applied to this plant indicate a confusion of it with the preceding species. "Mealy starwort," however, is a name of its own and refers to the scurfy corollas.

FOSSIL PLANTS AND CLASSIFICATION

HENRY S. CONARD, GRINNELL COLLEGE

IN two papers published two years ago, the writer attempted to bring together several lines of botanical research into an outline of classification for it is our conviction that a true taxonomy must aim to embody the results and conclusions of all research in every field that has any bearing upon the problem of plant relationships or resemblances. The outline there presented and re-affirmed here is:

1. Thallophyta
2. Embryophyta
 1. Atracheata (Mosses)
 2. Tracheata
 1. Lycopsida (Lycopodiales Equisetales)
 2. Pteropsida
 1. Aspermae (Ferns)
 2. Gymnospermae
 3. Angiospermae

There are two objections to this scheme, namely, the greater convenience of the old system for thought and teaching, and the questionable validity of fossil evidence in the classification of living plants.

The first objection applies equally to all attempts to change from an outgrown or erroneous system to a new one. Those who are accustomed to any system, feel that it is more convenient for thought and teaching than any other. Additional years of experience convince me that the proposed new system is much easier and simpler for beginners than the old. I feel quite certain that this would prove true wherever this arrangement is tried.

The serious question is whether or not the fossil series can be drawn upon for light on the classification of living forms, or, to put it most baldly, whether fossil evidence can be used to break up what now appear to be homogeneous groups. In short, is our classification to be rigidly phylogenetic, or may it run crosswise of phylogeny whenever we believe a cross course is more convenient for thought and teaching?

If I understand the trend of thought, it is accepted that classifications should be, as far as our knowledge goes, phylogenetic. Presumably all who accept the doctrine of descent are striving toward this end. If so, then correct thinking and correct teaching must of necessity follow phylogenetic lines, whether it is convenient or not. And in the end, the correct way must be the convenient way.

There still remain however certain questions of the grouping of forms. An example will illustrate one of these. The bush lima bean originated about 1890 from three distinct climbing or "pole" limas:

Sieva bean gave Henderson's bush lima.

Potato lima gave Kumlerle bush lima.

Flat lima gave Burpee's bush lima.

Shall we classify them as (1).

Phaseolus lunatus

var. 1. Pole bean: Sieva, potato, flat.

var. 2. Bush lima: Henderson's, Kumerle, Burpee's.

or (2).

Phaseolus lunatus

var. 1. Sieva: pole and bush forms

var. 2. Potato lima: pole and bush forms

var. 3. Flat lima: pole and bush forms.

The phylogenist will surely choose the last. The case is plain, because the phylogeny is a part of recorded history. Freeman in the Standard Cyclopedias gives the following:

Phaseolus lunatus, Sieva or small lima bean

Bush form: Henderson's.

var. *macrocarpus*, Large lima bean

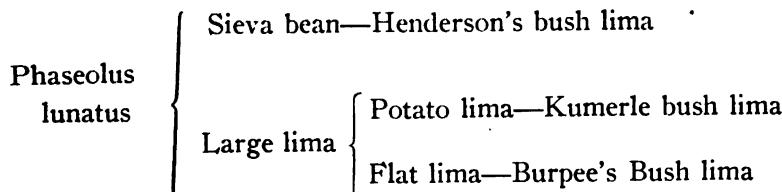
Potato lima

Bush form: Kumerle

Flat lima

Bush form: Burpee's

This may be written in diagram:



And yet I can imagine a botanist accepting and preferring the first scheme above, because it is easier to grasp and use for certain purposes. However, if classification is merely a convenient cataloging of things, then I am not much interested

in it. If it is a summary of all knowledge, condensed into a logical series of catch-words, then it is worth the devotion of many lives.

The fossil evidence on plant origins presents a picture similar to that of the beans, but much more difficult. Had we a complete record of all the plants that have ever lived on the face of the earth, the evolutionist must believe that all sharp boundaries between orders and families and genera would melt away. Perhaps all species as we now know them would also grade insensibly into other species. There would remain at best such distinctions as between Jordan's Drabas or de Vries's Oenotheras. Perhaps we should be reduced to such gradations as those of the corn varieties bred in Illinois, or of Castle's hooded rats. What then would become of classification? Does that mean that the use of fossil evidence in classification must lead us more and more into a mist of uncertainty? Does it mean that there will be no families and orders and classes when our knowledge is complete, but only one uninterrupted and insensibly graded family tree?

By no means. Could we only know the details of the plant family tree, we could mark off the orders and families in a phylogenetic manner with a precision now quite impossible. Each line of descent would form a "natural" taxonomic group. And this, I believe, is the ideal for a synthetic system! There will always remain, of course, the difficulty of assigning a place to a generalized form, a common parent of two or more lines of decent. And this is equally true whether we think of a parent as one individual or a group of similar individuals. Perhaps we shall have to develop a new kind of nomenclature for generalized forms, or a new nomenclature altogether. Once the problem is clearly seen, its solution can be confidently expected.

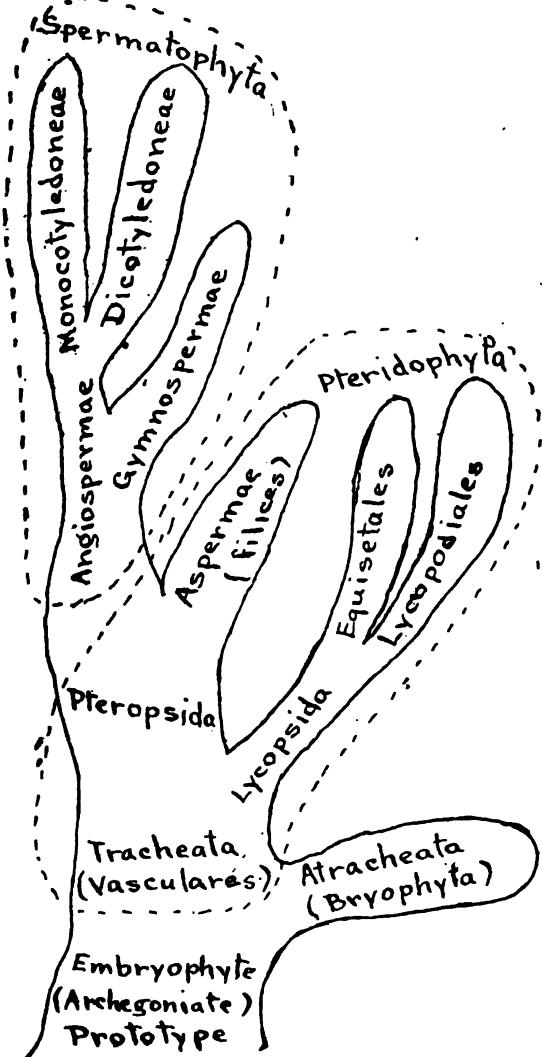


FIG. 1.—FAMILY TREE OF THE HIGHER PLANTS

It seems right therefore to conclude that a true classification must find its chief justification in its harmony with fossil evidence, as well as with all other kinds of evidence. One may even assert that no evidence is so unquestionably conclusive as is that drawn from fossils.

In applying these considerations to the old established group Pteridophyta, we find a curious jumbling of forms with superficial resemblances. There is ample reason to believe that the phylogeny of these groups runs somewhat along the lines of our figure.

There is of course some logic still in uniting all of the seedless Vasculares in one group, Pteridophyta, and the seed bearing forms in a separate and co-ordinate group Spermatophyta. But can these groups properly be called co-ordinate? Is not this to becloud the facts of anatomy and palaeontology?

No one familiar with fossil botany questions the intimate relation of ferns (Aspermae) and gymnosperms. We have had proposed the intermediate groups Cycadofilices and Pteridosperms. There is on the contrary no known connection between the Lycopsidan and Pteropsidan branches of Tracheate plants. This fact is just as cogent if we accept Scott's Sphenopsida as co-ordinate with Lycopsida and Pteropsida. The logical separation therefore occurs at this point of "unconformity." The basic division of Vasculares is into Lycopsidan and Pteropsidan (and perhaps Sphenopsidan) branches. In this case Pteridophyta and Spermatophyta no longer hold. D. H. Scott writes: "It will be noticed that this grouping crosses the customary division of Vasculares into Pteridophyta and Spermatophyta. Though the traditional classification will, no doubt, continue to be used on grounds of convenience, it no longer, in the light of the palaeontological evidence, expresses a natural arrangement, for the affinities

between Pteridosperms and Ferns appear to be far closer than those between Ferns and any other Pteridophytic phylum." There remain three well co-ordinated groups of Pteropsidans:

Fern allies or Aspermae

Conifer allies or Gymnospermae

True flowers or Angiospermae

This is by no means original with the writer. It rests upon well known investigations. But it has not been sufficiently emphasized, and has not yet found its way into the common texts. It seems necessary therefore once more to call attention to the matter.

MIDSUMMER FLORA OF TUBA OASIS

(concluded)

Rhus triloba Nutt. SKUNK-BRUSH. This attractive shrub closely related to the Eastern *Rhus aromatica* is common in the oasis. The fruits are used by the Indians and the plant is locally known as "squaw-berry." 105

Sphaeralcea lobata Wooton. NIGGER-WEED. Common in dryish waste ground. Flowers like diminutive hollyhocks. 113

Sphaeralcea grossulariaefolia Hook & Arn. GLOBE MALLOW. Common in waste ground. 112

Epilobium Fendleri Hossack. WILLOW-HERB. Common along a rill north of Tuba. This appears to be somewhat out of its range. 109.

Oenothera ornata A. Nels. EVENING PRIMROSE. This plant, plentiful in the orchard at Tuba, has been referred to this species previously collected in Idaho. If the two are iden-

tical this is far beyond the credited range of the Idaho plant. The petals are so deeply emarginate as to make the flower seem 8-parted. The flowers open at dawn and close before midday. The moist spots in the desert are nearly always inhabited by species of primroses of many different forms which apparently are in need of more careful study. 102.

Anogra pallida (Lindl.) A species of evening primrose with white flowers that turn pink as the blossoms age, is very abundant in many places in the desert. The plant at Tuba was not collected but it is assumed to be this species.

Berula erecta (Huds.) An abundant umbellifer of no particular beauty in all wet grounds. 108.

Forestiera Arizonica (Gray). A curious shrub belonging to the olive family is common in various places about the oasis. This was originally described as a variety of *F. Neomexicana*, but Dr. Rydberg regards it of specific rank. It has seldom been collected. There is only a duplicate of the original type at the New York Botanical Garden. 118.

Centaureum Arizonicum (A. Gray). CENTUARY. This plant, with flowers like small pink sabbatias, was common in many moist places about the oasis. 58.

Apocynum cannabinum L. INDIAN HEMP. The Indian hemp is used by the Indians for various purposes and large thickets of it were found in many places where its growth is doubtless promoted. The specimens exhibit certain differences from the plant of the same name in the eastern part of the country. 87.

Dodecatheon sp? SHOOTING-STAR. Specimens which unmistakably belong to a species of *Dodecatheon* were found in fruit on a springy bank. They were not further identified.

Asclepias speciosa Torr. SHOWY MILKWEED. One of the finest plants of its genus, with large purplish flowers. Or-

chard at Tuba and elsewhere. 76.

Convolvulus arvensis L. BINDWEED. This familiar weed was abundant in the gardens at Tuba. 94.

Cuscuta arvensis Beyr. DODDER. Common on the borders of wet grounds, clinging to species of *Xanthium* or other weeds.

Gilia Gunnisoni Torr. This small species, with tiny whitish flowers was common in the driest adobe at Tuba. It was not seen elsewhere and through a desert plant, is thus included here.

Heliotropium spathulatum Rydb. A single colony in an abandoned field at Tuba. 96.

Verbena bracteosa Michx. VERVAIN. A common weed in gardens. 93.

Mentha Penardii (Brig.) MINT. This plant, with much the aspect of the field mint, (*M. arvensis*), to which it is near allied, was common at Reservoir Conyon. 88.

Lycium pallidum (Miers), TOMATILLA. A spiny shrub common in adobe soil. Flowers greenish, resembling those of its congener *L. vulgare*. Fruits pale red, reputed to be poisonous but used by the Indians after proper treatment. 4.

Androsora rostrata (Dunal.) BUFFALO-BUR. A single colony at the "sheep dip." Evidently introduced. 97.

Chamaeseracha coronopus (Dunal). Abundant in cultivated areas. 78.

Datura meteloides D. C. DESERT TRUMPET FLOWER. Growing about the buildings at Tuba and in many places in the desert. Used by the Indians. 110.

Solanum triflorum Nutt. BLACK NIGHTSHADE. Common in cultivated ground. 126.

Mimulus guttatus DC. This northern form was found at Reservoir Canyon and seen later at Schultze's pass in the San

Francisco mountains at an altitude of 8,000 feet. The elevation of Reservoir Canyon is not over 3,500 feet and the species was quite unexpected here. 89.

Castilleja lineariaefolia Benth. PAINTED-CUP. Common and wide-spread. 84.

Iva axillaris Pursh. An unattractive weed common in cultivated soil. 117.

Chrysothamnus graveolens Nutt. RABBIT-BRUSH. Plentiful in good soil. Found in both flower and fruit. Used by the Indians in basketry. 120.

Solidago trinervata Green. GOLDENROD. The only species in flower though another species gave indications of blooming later. Both forms uncommon. 64.

Macheranthera parviflora A. Gray. An insignificant weed in dryish soil. 134.

Gnaphalium palustre Nutt. CUDWEED. Common on the moist borders of a reservoir at Tuba. 124.

Helianthus petiolaris Nutt. This sunflower is very plentiful in the desert and the form at Tuba is likely that species. No specimens were collected.

Ximenesia encelioides Cav. CROWN-BEARD. An abundant composite in cultivated soil elsewhere. Has the aspect of *Helienum*. 104.

Cirsium calcareum (Jones). THISTLE. Plentiful and very attractive to a large dark-colored species of humming-bird. 117.

Sonchus oleraceus L. Sow THISTLE. In cultivated grounds, common. 103.

THE SASSAFRAS

By MRS. VIOLA F. RICHARDS.

THE sassafras (*Sassafras officinale*) is found in North America from Canada, where it is only a bush, to Florida where it sometimes reaches a height of fifty feet. It has small greenish-yellow flowers which appear before the leaves and leaves which vary considerably in form as will be seen by the accompanying photograph which shows the upper side of four leaves picked from one small twig.



The wood of this plant is soft, light, and coarse with an agreeable smell and pungent, sweetish taste. The thick spongy bark of the root is used for medicinal purposes. It is a powerful stimulant, sudorific, and diuretic and is also used in skin diseases. The leaves contain so much mucilage that they are used for thickening soup.

An agreeable beverage is made by an infusion of sassafras bark or wood and a similar drink was at one time commonly sold in the streets of London under the name of Saloop.



NOTE *and* COMMENT



MONOCARPY.—With respect to flowering, plants fall into two distinct groups. In one, the flowers bear fruits only once and then die; in the other, they may fruit annually over a long term of years. Plants of the first group are known as monocarpic plants. The great majority of this latter group are of course, annuals or biennials, but others require a much longer time to complete their life cycle. The classic instance of this kind is found in the talipot palm (*Corypha*) which grows for forty years or more without a flower and after reaching a height of upwards of fifty feet sends up in a single season a flowering shoot nearly as tall as itself, after which the plant dies. There are a number of other plants whose *branches* fruit but once, among which are the Solomon's seal, the lily-of-the-valley and the peony, but in these the plant as a whole is a perennial and lives for many years. The so-called century plant and the yucca form a sort of connecting link between these two groups, for while the original plant dies after fruiting it does not do so until it has given rise to a number of new shoots which not only reproduce the old plant but also multiply it. In the *Journal of Botany*, G. R. Wieland names a number of other long term monocarpic plants including the Mauritius hemp (*Furcraea Americana*), several of the bamboos (*Bambusa*), and the climbing bamboo (*Chusquea abietifolia*). Another interesting species mentioned is the "pride of the mountain" (*Spathelia simplex*) which is native to Jamaica. This species reaches a height of fifty feet with a cluster of pinnate leaves three or four feet long at the top.

When mature, a terminal cluster of showy purple flowers rises above the leaves and by the time the fruits are ripe the plant has ceased to live. Nearly all the large monocarpic plants belong to the monocotyledons, but this last mentioned species is a dicot.

PEST VERSUS PEST.—It is with reluctance that we record anything in favor of the English sparrow but even the devil must be given his due, and we note here that one of the sparrow's favorite foods is dandelion seeds. On closely clipped lawns infested with dandelions he delights to discover the globular heads that have escaped the mower and seldom leaves them until the last seed has disappeared. However, he has begun the work of weed eradication too late. There will never be enough sparrows to eat up all the dandelion seeds.

FLOWERS THAT CHANGE COLOR.—Two lists of flowers that change color with age have appeared in recent numbers of this magazine but both missed the flowering currant (*Ribes aureum*). This fragrant shrub, so common in cultivation, has yellow flowers, but the yellow is the color of the sepals. The petals are much paler. After the flowers have been open for a short time, however, the petals become red and thus make a decided contrast with the sepals which do not change.

ANT GARDENS.—Everybody has heard much about the sagacity of the ants; of their fondness for honey-dew secured from plant lice, of the habit of some species of keeping slaves, of their cultivating certain grasses for food, or their raising mushrooms in underground caverns upon spawning beds made by the ants, of their methods of storing honey in certain elderly females of the colony, of their association with plants which cater to their wants and of many other things that corroborate Solomon's good opinion of them. Fully as wonder-

ful as any of the features mentioned are the ant gardens constructed by several varieties of South American ants, of which photographs are shown in a recent number of *Ecology*. In building the gardens, the ants select a suitable branch of a tree upon which they heap a considerable quantity of earth and humus. Upon these roundish structures certain plants begin to grow. Whether these are planted by the ants is not certain, but nearly always the same kind of plants are present and in any event their roots penetrating the mass hold it together while their aerial parts protect it from the torrential rains and thus form a home for the ants. Fourteen species of plants belonging to no less than six widely separated plant families have been collected from such ant gardens. Among them are cacti, peppers, and figs. The plants are so commonly associated with ant habitations that six separate species have *myrmecophilum* or *formicarum* for specific names.

THE CURIOUS DODDERS.—Twenty-six species of the genus *Cuscuta* are found in the United States and thirty-three in Mexico. All are parasitic, twining about other plants from which they take their food by means of sucking organs termed haustoria. All the species are commonly known as dodders. In a monograph of the genus by G. H. Yunker recently issued, there is much interesting information about them. Some are so slender that the stems measure only a tenth of a millimeter in diameter. Most of the species attack herbs, but a number prey upon woody plants. The flowers range from a millimeter to seven millimeters in length and in some species they are produced within the stem and burst forth at the time of blooming.

GIGANTIC BLACKBERRIES.—Probably the largest blackberries in the world have recently been discovered in Columbia. The best specimens measure two and a half inches long

and an inch and a half through—nearly five inches in circumference. The fruit is light crimson in color and the flavor is said to resemble that of the logan-berry. It is said to possess more seeds and less juice than do ordinary blackberries from which it is apparent that its chief use to American growers will be for hybridizing with more palatable fruits in order to increase their size. The plant prefers a moist, cool climate but is reported to be somewhat tender and it is likely therefore to be useful only in parts of the West. In cross-section the fruit is inclined to be four or five-angled. Some question still exists as to the exact scientific name of the new fruit. It is much like forms of *Rubus macrocarpus* and *Rubus roseus* with considerable likelihood that it is the latter species.

FORMA VERSUS VARIETY.—What is the difference between a form and a variety? The average individual would reply that there is no difference worth mentioning, but the scientist can distinguish tweedledee from tweedledum with a large margin of safety, especially when such distinction give him a chance to make one of the "new combinations" so dear to the heart of the closet naturalist. A variety is a form differing from the normal, but the variety is by implication a rather more stable thing than the form. It is, however, rather amusing to find reputable botanists venturing a double author citation on the strength of calling a variety a form or the reverse. The botanical species has recently been roughly handled by the scientist who finds it to include elementary species, races, varieties, sub-varieties and a large number of geographical, ecological, physiological, seasonal and other forms. To dignify these small differences from the normal with a double author citation seems to many people unworthy the attention of a real scientist and gives reason for

the suggestion that the "personal advertisement," as C. G. Lloyd so aptly expresses it, be omitted altogether.

COMMON NAMES FROM SURNAMES.—In his recent *Flora of Glacier National Park*, Dr. Paul C. Standley tells us, in his note on *Thlaspi arvense*, that "in some parts of the Northwest the name 'Jim Hill weed,' is applied to the species, the ranchmen having associated its appearance with the building of the Great Northern Railroad." This name had not penetrated to the Dakotas and Minnesota when the writer last botanized in those States, the favorite name there being "Frenchweed" or "fanweed", while the European name of "penny cress" seems never to have reached the West. But the memory of the great empire-builder, the most virile and commanding figure in the development of the Northwest, has also been kept alive by the appellation of "Jim Hill mustard" bestowed upon the European "tumble mustard" (*Sisymbrium altissimum*) which began to appear in the Mississippi Valley about 1890, evidently coming from the westward, and which was at once associated in the public mind with the building of the new railroad and its great directing figure. Nothing could more vividly express the strength of the impression which James J. Hill left on his generation than this commemoration of his name in the case of these two weeds. On what other citizen of the republic has such a distinction been conferred? I can think of no other name that represents any actual personage of modern times. Mythology and sacred history have contributed to botanical nomenclature in such names as "Hercules' club," "Three-seeded mercury," Venus' comb," "Venus' looking-glass," "St. Andrew's cross," "St. John's wort," "St. Peter's wort"—and even our common parents have been remembered in the names "Adam and Eve" and "Adam's needle;" but while innumerable laymen as well as scientists

have been immortalized in the *scientific* names of plants, rarely indeed has any human being so powerfully impressed his contemporaries as to be commemorated in a vernacular plant-name. One occasionally will find a name of this character current over a very limited area: for example, in many parts of Polk County, Oregon *Hypericum perforatum* is known as "Gwin-weed," from the person who is said to have unwittingly introduced this pest in nursery-packing; but such names are merely sporadic and local. All honor to the great pioneer of the Northwest, who deserves to be remembered by a far handsomer and less pestiferous plant than either of the two weeds which now bear his name—*J. C. Nelson*. [Prof. Nelson has overlooked the name "Ransted" often applied to the toad-flax (*Linaria vulgaris*) in allusion to the person who introduced it into the United States. "Joe-Pye-Weed" commemorates an Indian doctor who used the plant so named in medicine, and "Bowman's-root" is probably similarly derived. The well known "timothy" grass is said to derive its name from Timothy Hanson who introduced it into America about 1720, though W. Ellis, writing in 1750 calls this St. Timothy's grass. Additions to this list are desired.—Ed.]

POISON Ivy.—Everybody knows that poison ivy (*Rhus toxicodendron*) will produce a dermatitis, as the medical wights call it, when applied to the skin of susceptible individuals, but the question whether it can produce its well-known effects from a distance often comes up without a very satisfactory answer. James B. McNair, after a careful study of all parts of the plant, concludes that contact with the plant is necessary to cause poisoning. In an article published in the *American Journal of Botany*, he states that neither the anthers, the pollen, the epidermal hairs, the bark, nor the wood is poisonous but that the fresh sap undoubtedly is; in

fact, that this is the only part of the plant that is dangerous. There exists a widespread belief, however, that people may be poisoned at a distance from the plant, the poisonous principle being supposed to be conveyed by the pollen or plant hairs. Not all people are susceptible to the poison, but those who are, usually give the plant a wide berth and still are poisoned. The smoke from burning poison ivy is also said to poison some people. The harmful principle is a resin. Possibly at certain seasons some emanation from this source may cause the intense itching and vesication characteristic of this affection.

YELLOW IRIS NATURALIZED.—Recently while driving I found an iris quite new to me. It was growing in low wet ground by the roadside and its one remaining flower was a bright soft yellow in color. The leaves were long—quite two feet or more—and narrow and bright green, lacking the soft bloom that many of our cultivated varieties possess. The flower, which had evidently passed its best days, was about the size of our common native species but with the inner divisions of the perianth very short, after the fashion of the Japanese iris. The only light I can find on the subject is a note in Gray's Botany saying that the yellow iris of European marshes "is reported as having become established in Mass. and N. Y." The flower is very attractive and if you can give me any information in regard to it, through the magazine, I shall be very glad. As much of it was being destroyed by the grading of the road I brought a clump home with a clear conscience. I wonder if hybrids of value could be grown from it.—*Adella Prescott, New Hartford, N. Y.* [The plant referred to is *Iris pseudacorus* a European species often offered in the catalogues of iris dealers. Like many other Old World plants it has a disposition to look out for itself and

has escaped from cultivation in several places. It is good for naturalizing along streams and in wet places but the flowers are too small to make them desirable for cutting. It is likely that the plant may be of value for introducing a strain of yellow into the garden irises. Pure yellow flowers of this kind are still rare.—ED.]

FREAK Dogwood.—In the spring of 1920, I found a curious flowering dogwood. It was about twelve feet high and very thickly covered with flowers. Instead of the usual four broad bracts around each bunch of florets, however, there were two narrow ones. The whole tree was searched carefully for normal bracts and none were to be seen. I never saw so many berries on a dogwood as that tree displayed in the fall. In January the tree was visited again and I was not surprised to find only small and pointed buds foretelling that it would have nothing but leaves to show next summer.—*Nell McMurray, Clearfield, Pa.*

WANTED AND FOR SALE.—Dr. W. N. Steil, University of Wisconsin, Madison, Wis., is making a study of the antherida of some of the scale mosses and desires living specimens of *Riccardia pinguis*, *R. multifida* and *Pellia* from other localities for study. The Riccardias are tropical and subtropical plants belonging to the thallose Jungermanniales. They have a fleshy thallus usually with short lateral branches upon which the sex organs are borne. They grow in swamps and low grounds. Anyone who can collect specimens of these plants should communicate with Dr. Steil. Those who wish specimens of Rocky Mountain plants for their herbarium will be interested in knowing that Mrs. M. E. Soth, Pocatello, Idaho, has specimens for sale. These include a number of alpine specimens.



EDITORIAL



The subject of evolution has been so obfuscated by discussions of minor details that many people are in danger of regarding the whole matter as too deep for them. As a matter of fact, the principles of evolution are easily comprehended; it is only the working out of these principles that gives rise to doubts and differences of opinion. In a recent number of *Science*, Prof. C. C. Nutting points out that there are really only three main factors in evolution and that all three are capable of proof and are admitted by practically everybody. These three are (1) *heredity*, by which children tend to resemble their parents or at least the family line, (2) *individual variation*, which prevents any organism from being exactly like another, and (3) *geometrical ratio of increase*, by which each species tends to produce more individuals than can survive. Given these three and some kind of evolution is bound to occur. As to how it occurs scientists are not quite agreed. Darwin held that new species were in the main produced by the accumulation of small variations through considerable lapses of time, being helped thereto by the crowd of species, forms and individuals which made it possible for only the best fitted to survive. The Mutation Theory of DeVries distinguishes two forms of variation and intimates that only one of these results in new species. The first or *continuous variation* might be illustrated by mere size in individuals which tends to vary forever with the food supply and other conditions. The second or *dis-continuous variation* results in the "sports" which appear suddenly and do

not thereafter return to the usual form. For a time it was held that all advances in evolution were due to discontinuous variation and the unlike forms which result from it, but the studies of many investigators have shown that discontinuous variation may produce small variations that are just as stable as large ones. That many new species have originated by mutation can scarcely be doubted but that other species fully as good have arisen through the small variations described by Darwin is equally certain. Continuous variation, could of course, originate nothing. It is only when such a variation swings so far in one direction that it cannot return that new species may result, but in such a case it is no longer a continuous variation. Any further variation must be around a new set of characters; that is, around a new species or variety.

BOOKS AND WRITERS

A second edition of John N. Martin's "Botany for Agricultural Students" being needed, the author has taken the opportunity to change its title to the more appropriate "Botany with Agricultural Applications." At the same time various errors in the text have been corrected, new matter has been added, additional illustrations provided and other illustrations improved. The book is now an octavo of more than 600 pages and 488 illustrations. The subject matter of the book is that of the usual textbook, but it differs from others in drawing its illustrative material chiefly from agricultural sources. It is issued by John Wiley & Sons, New York, and costs \$3.50.

* * *

The author of a recent botanical work, published by himself, boasts in his advertising that he allows no discount to dealers. Apparently he expects the seller of books to work

for nothing or for the glory of serving so eminent a man. As a matter of fact the bookseller has a living to make and depends upon bringing author and publisher together to do it. He knows of hundreds of possible purchasers for each work, but unless he is repaid for his time, trouble and for his investment in postage, advertising, catalogues, rent and the like, he will simply ignore the new volume, however meritorious it may be, and devote his efforts to selling books in which there is a profit for him. A number of botanists are fooling themselves into believing that they can sell as many copies of their books as can the experienced publisher. To advertise that no discount is allowed is simply to call attention to one's inexperience. In all phases of existence, it is better to play the game according to the rules. That is what the rules are for!

* * *

Sooner or later, each Commonwealth in our Nation arises to the patriotic duty of taking account of its trees. Indiana did this in 1911 by issuing ten thousand copies of "The Trees of Indiana," by Charles C. Deam. In less than three years the edition was exhausted and another of a thousand copies went the same way in five days. This induced Mr. Deam, who is State Forester, to plan a new and larger work and this has now appeared as a revised edition of the original volume, though the book has been entirely re-written. Indiana has been particularly fortunate in the selection of a Forester. Instead of sitting in his office and trying to imagine trees, Deam has gone out after them. Since the first edition of his book was published he has travelled more than 27,000 miles in the State by auto, visiting every county and nearly every township. He may be said to really know the trees though the Reviewer thinks he knows of one that he missed. This,

however, appears to be a new species or variety and will be pointed out to the Forester in due time. In treatment the book follows the general run of tree-books. There are illustrations of the leaves, flowers, fruits and other parts, made from photographs of herbarium specimens, descriptions of the trees in untechnical language, a careful account of the distribution of each species, and various remarks concerning the uses of the wood, peculiarities of distribution, and similar matters. The perplexing genus *Crataegus* has been written up by W. W. Eggleston, an authority on the subject. The book has many points of interest and should be of value, not only to residents of the State but to students in the surrounding States as well.

* * *

The average man reacts to the sight of a new plant by first asking its name and then what it is good for. If the specimen happens to be an edible plant, he will be pretty sure to find an answer to his second question in Sturtevant's "Notes on Edible Plants" recently issued by the Department of Agriculture of New York State. The compiler of this list, the late Dr. E. L. Sturtevant was well known to an older generation as a man deeply read in the subject of economic botany, who had spent almost a lifetime in the study of useful plants. During his life he published many papers on the general subject, but his greatest work, a list of the food plants of the world with notes, was left unfinished and after the lapse of some twenty years has now been arranged and edited by Dr. U. P. Hedrick. This forms a quarto volume of nearly seven hundred pages. In it, the plants are arranged alphabetically by genera. The nomenclature is that of "Index Kewensis" and therefore for the most part free from the changes that have made the nomenclature of the last quarter century more

or less of a joke. An examination of the book shows few if any important crop plants that are unknown to the general reader. The minor crops listed are apparently rarely capable of being developed into valuable additions to our farms and gardens. There is listed a large number of fruits, especially from the tropics, that have heretofore been practically unknown and a still greater number of plants that can be used as pot-herbs, teas, etc. These latter have been largely reported as being used by Indians and the natives of various uncivilized parts of the earth. Moreover, since it would be manifestly impossible to try out a hundredth part of the plants mentioned, a majority are reported on the frequently inaccurate observations of travellers. In this way the hard, bony seeds of the witch hazel are reported on the strength of a statement by Rafinesque, and the highly poisonous seeds of *Datura Metel* probably (*D. Meteloides*) are given a place. *Cyphomandra Hartwegi* from Granada is said to be used in Buenos Aires. It may be added that it is fairly common in Jamaica and has been shipped to the New York markets under the name of Jamaica goose-berry. Although a large number of the plants listed are only of nominal food value, their inclusion greatly enhances the value of the book. We now feel that we have a pretty complete list of the food plants of the world under recognized scientific names in a single volume. The notes for the most part are largely concerned with the parts of each species eaten, the treatment necessary to make them palatable, their flavor and other characters, and references to the other works from which this information was drawn. All the staple crops are treated at considerable length and their varieties discussed.





ROCKY MOUNTAIN COLUMBINE—*Aquilegia Coerulea*

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*In purple and gray-wrought lichen
The boulders lie in the sun;
Along the grassy footpath,
The white-tailed rabbits run.
The crickets work and chirrup
Through the still afternoon;
And the owl calls at twilight
Under the frosty moon.*

—Bliss Carmen

OLD GARDEN FLOWERS

THE COLUMBINES

The gardening novice often fancies that the plants he cultivates are in certain specific ways different from the so called "wildflowers." It is of course true that garden flowers are in many cases greatly changed from the representatives of their race afield, but all good gardeners know that our garden flowers, or at least their progenitors, all grow wild somewhere. These undomesticated specimens frequently offer merely a basis upon which to build beauty; they become attractive only when the gardener has improved them. Single flowers of no particular grace of outline are all the better for doubling and small flowers are enhanced in value by an increase in size, but there are other flowers that need no aid from the cultivator. They are born with a beauty that is difficult to improve upon. An increase in size, a change in color, or a greater profusion of flowers is all that the gardener can hope to accomplish. Theirs in a beauty of form and line that doubling only mars. It is to this latter group that the columbines belong.

The curious flowers of this group with their five petals turned to "spurs" or nectaries, are borne on slender pedicels and have an exceedingly light and airy appearance which is heightened by the much-divided leaves not so unlike the leaves of the maidenhair fern in form. The slender nectaries make the flowers attractive to butterflies and long tongued bees and probably have earned the plant its name of honeysuckle. The older and better-founded term is columbine from *columba* a dove in allusion to the hooked spurs of a common European species in which a vivid imagination may fancy a group of doves. The scientific appellation of the group is *Aquilegia*.

Although all columbines have spurs, there is considerable diversity in their size and shape. Some are scarcely longer than the sepals, while others are several times as long. The location and arrangement of these spurs or nectaries are plainly to secure cross-pollination of the flowers, but the bees often do not play fair and instead of exploring the nectaries as they should, bite through the tip and thus secure the sweets without performing any useful work in return.

The commonest columbine in cultivation is *Aquilegia vulgaris*; in fact, the specific name indicates as much. It is a native of Siberia and has long been cultivated in Europe where it has produced many forms that are now spread widely in the world. Though considered a garden plant in America, it has become a wilding again in some places. There are several other forms in Siberia, but the genus is not confined to the Old World. It circles the earth in the North Temperate Zone and the majority of the species are American. The latest monographer lists twenty-five species from our part of the world. All but one are Western.

The species of Eastern America is the wild red columbine (*Aquilegia Canadensis*). It takes readily to cultivation and

thrives in a variety of soils. In the wild state it grows on rocks, in meadows and on wet banks. The best of the Western species is a fine blue-and-white form from the Rocky mountain region known as *Aquilegia coerulea*. It is the species chosen as the State flower of Colorado. In his Monograph E. B. Payson writes of it: "In the Canadian Zone, among the aspens, spruces, and firs, it is not uncommon to see a hillside meadow so completely covered with *A. coerulea* as to hide all other vegetation and to make it seem a fairy-land of huge, dancing blue and white stars." This species is illustrated in our frontispiece from a photograph kindly lent by Mrs. M. E. Soth. A peculiarity of the flowers of this species is that they are not drooping as are those of the common species of Europe and Eastern America. This erect habit is not, however, restricted to this single species. Several of the Western species have it.

Aquilegia chrysanthia is a yellow-flowered form with long spreading spurs that is often seen in cultivation and is scarcely less popular than the blue-flowered species. More than a dozen other kinds are cultivated but the majority are either forms of, or hybrids between, the species already mentioned. The plants mix readily and if one wishes to obtain pure seeds or to keep a particular strain from running out, the plants must be isolated from the others.

The columbines are perennials but some behave much like biennials and often disappear after the second year. The columbines seem midway between the true annuals and the ordinary perennials. Like annuals, however, they readily grow from seeds and in some cases come up with such spontaneity as to make them almost weeds. Seed production is a critical period in the life of any plant and many species do not survive it. Removing the seed-pods as soon as they form

will probably aid in prolonging the life of desirable plants. In their native haunts the species favor rich soil in rocky places and in the garden are frequently planted in the rockery, though they do equally well in any good garden soil. Practically all the species are flowers of spring or early summer. Although the genus is so well known it is likely that there are a number of species still to be discovered.

WAYSIDE FLOWERS

BY ADELLA PRESCOTT

ONE of the pleasures that automobiles have brought to nature lovers who by reason of limited time or strength are unable to spend much time in the field, is an increased knowledge of the distribution of plants. Species that are scarce or even rare in one locality are sometimes quite plentiful a few miles distant. In the vicinity of my own home, the quaintly dignified turtle head (*Chelone glabra*), that lover of low grounds and watersides, is seldom found—so seldom that a little thrill of pleasure comes with the finding of a fine plant—but last summer I was surprised and delighted to find it bordering the ditches and filling the fence corners along a road only thirty miles distant and growing with a luxuriance I had never seen before.

Bouncing Bet would hardly be expected to cause a thrill under any circumstances but this same free-and-easy denizen of our roadsides gave me a vision of loveliness that rarer flowers might be glad to emulate. One day our road ran parallel to a railroad whose roadbed was fifteen or twenty feet above the level of the highway and for two or three miles the track was bordered with Bouncing Bet which swept down

the sloping sides of the roadbed in drifts of faintly rosy bloom spreading over the levels below with a tenderness and grace hard to reconcile with my previous opinion of this somewhat coarse and ragged plant. Of course it was distance that lent enchantment, but the picture was one that will live long in my memory.

Wild iris was one of the things that I had seen only in scattered clumps until we drove beside a sluggish stream where for a long distance the swampy ground on each side was softly purple with blooming irises. Since then I have seen similar masses many times and it seems to me the most delightful of "color schemes" that we see along the road for in this vicinity, daisies, buttercups, and devil's paint-brush form a large proportion of our color pictures and none of these have the elusive charm and beauty of the iris.

Of course, besides these larger pictures that fill the eye, even when seen from a swiftly moving car, there are many glimpses of exquisite beauty such as the noisy little brook that came racing down a steep ravine with much fuss and bother quite ignoring the forget-me-nots growing thickly along its path in its eagerness to reach the sea, the tiny bulbous bladder ferns fringing a dripping cliff ledge, and the rhexias gleaming like jewels among the sand and moss besides a lake-shore road.

Automobiles are well known to have a large share of the depravity of inanimate things and for this reason, probably, punctures and blow-outs usually occur at the most barren and uninteresting places but one day the motor most obligingly died beside a springy meadow where ladies tresses grew thick among the stubble. The passenger waited very patiently that day for the necessary adjustments that later started us again on our way. Orchids, even the tiniest, always stir the blood

a little and to find the dainty things in such abundance was a treat indeed.

When some genius invents a chauffeur who can be started and stopped—especially stopped—by pressing a button like other parts of the mechanism, then in truth will the cup of nature lovers whose desires and ambitions far outrun their lagging feet, be filled with joy.

NOTES ON OREGON PLANTS

By R. V. BRADSHAW.

During the past summer a peculiar water plant came under my observation. It was found growing on the rocks in the Willamette River not far from Eugene. During high water these rocks are submerged, but in the dry season they project far out of the stream. The plant is unable to flourish out of the water, for as the water goes down it is killed by the hot sun and drought. In appearance it suggests a moss, but the branches are filiform, stiff and have no leaves. They are bright green and present a rather jointed effect, the joints being a darker green than the other parts. They are tufted and issue from the base directly and do not branch further. Besides these, at the base also arise little bladder-like organs which are open at the top and resemble a small empty caddis-fly case. These bladders were about 5mm. long and were about 2mm. wide. The tufted branches were nearly 7mm. long. This interesting plant was determined by Dr. Howe of the New York Botanical Garden, who calls it *Lemanea fucina rigida*. It is one of the few red algae that inhabit fresh water.

Attention was called in the February, 1920, issue of the

Botanist to the collection of *Cynosurus echinatus* (the dog's tail grass) at Eugene. Since that article was written this species has been found also about a mile north of Eugene on the Pacific Highway and at Fall Creek which is about seventeen miles southeast of Eugene. In both places this grass was abundant. At the first station it had crowded out everything else and presented nearly a pure growth; this was near a road and part of the stand had been cut. At the second station, a hillside overlooking a railroad, it was not so abundant.

Anthriscus anthriscus, a member of the parsley family, is another of the rare introduced plants of Oregon. I have collected but one specimen; it was at Eugene near the railroad. I think it has been collected probably once before in the state. This plant resembles *Conium maculatum* or the poison hemlock. The fruit however is beaked and bristly.

Cogswellia microcarpa, one of the dog fennels, which is not included in Piper and Beattie and which Howell mentions only from the Umpqua Valley on dry cliffs was brought in to me from the rocky hills between Eugene and Fall Creek. This plant looks not very much unlike *C. utriculata* which is so common about Eugene. Both have brilliant yellow flowers and beautiful green dissected leaves. These are members of the earliest spring flora.

The shepherd's needle (*Scandix pecten-veneris*) has been found in a few places in Oregon. This is another of the introduced weeds. But one specimen has been observed at Eugene and the following summer it was not to be found. This plant looks somewhat like a cross between an umbelliferous plant and *Erodium cicutarium* if such a creation were possible. The flowers are white and the fruit certainly does at a casual glance resemble that of an *Erodium*.

The cardinal monkey flower (*Mimulus cardinalis*) which

is more to be expected in Southern Oregon is sometimes collected in sandy places along the Willamette River near Eugene. I have seen three specimens in two successive years. Piper and Bettie's *Flora of the Northwest Coast* says of it: "In moist places, western Oregon, in the Umpqua Valley; perhaps not in our limits." I consider these of my collections to be merely strays, yet there is no real reason why they might not be permanent about Eugene, for those that I saw were flourishing.

One fall while walking on the north shore of the Willamette nearly a mile and a half from Eugene, I came upon a shrubby plant among a scattered growth of buck-brush (*Ceanothus cuneatus*) which I had never seen before. The dried capsules at once suggested the figwort family. The following summer I got the plant in bloom and was enabled to determine it. It was one of the pale yellow flowered *Pentstemons* (*P. deustus*). It was decidedly out of its locality, for Howell gives the distribution: "On gravelly banks in the dry interior region, Brit. Columbia to California, Nevada and Montana." The first part of this, "gravelly banks" aptly describes the habitat at Eugene. But this illustration only goes to show how little is known regarding distribution in a place like Oregon where botanists are indeed few.

PLANT NAMES AND THEIR MEANINGS--IX

LEGUMINOSAE—I

By WILLARD N. CLUTE.

That great group of plants characterized by flowers like the sweet pea and fruits in the shape of pods has had more than the usual share of changes in name. To the farmer the plants will probably always be "legumes" and the family to which they belong the Leguminosae. This is the oldest and best known title. It is derived from the Latin word which means to gather by hand. Apparently the plants of this group have been known as useful plants from the most ancient times. Another old term for the group is Papilionaceae from the latin *papilio* meaning a butterfly. This, referring to the shape of the flower, appears to be quite descriptive, but the modern idea that the family name should always be made from some type genus suggests that these names should be displaced either by Fabaceae from the bean genus (*Faba*) or Phaseolaceae from *Phascolus* still another bean genus. It is further to be expected in a family as large as this, containing nearly fifteen thousand species, that there will be various sub-divisions and these may themselves be considered good families by radical botanists. Thus we often find some of the plants ordinarily considered as Leguminosae in groups known as Mimosaceae and Caesalpinaeaceae. These latter, it may be observed are least like the species still considered to be in good standing in the Leguminosae. In the vernacular the members of the group are sometimes spoken of as "pulses", though this word is rarely used in America. Pulse is a very old term

for a sort of soup made from peas, beans etc., and the word poultice seems to have had a similar origin.

Generic names in the Leguminosae have frequently been given in honor of botanists. Such names are commonly of less interest than names referring to plant characteristics though they frequently have a historical bearing on the subject. The genus *Albizzia* was dedicated to a noble Italian family which is said to have introduced plants of this genus into Europe. *Lespedeza* commemorates a certain Spanish Lespedez who was governor of Florida about the time of the botanist Michaux and *Robinia* honors John and Vespaian Robin, two Frenchmen father and son, who were first to cultivate our *Robinias* in the old world. John Robin was herbalist to Henry IV. *Schrankia* is named for Franz von Schrank and Zorma for Johann Zorn both German Botanists. *Dalea* is for an Englishman, Samuel (or Thomas) Dale who flourished in the 17th century and *Vigna* is for Dominic Vigna an Italian scientist. As a matter of interest it may be added that *Cicer*, the name of the European chick pea seems to have given origin to the family name of Cicero while *Faba*, the name of the bean genus is supposed to have given the patronymic to the famous Roman general, Fabius.

Among American botanists immortalized by genera of Leguminosae are Thomas Morong (*Morongia*), Dr. David Hosack, professor of botany at Columbia College and owner of an early botanical garden (*Hosackia*), Prof. Casper Wistar a distinguished anatomist of Philadelphia who spelled his name with an *a* though the genus is known as *Wisteria*. A similar liberty has been taken with the name of J. G. Gleditsch a German botanist of the time of Linnaeus in the naming of a genus which is now written *Gleditsia*.

The group of plants under discussion, having been known from the earliest times, has many genus names whose origins are lost in the mists of antiquity. In such cases, conjecture often takes the place of knowledge and leads to suggestions that may or may not be correct. *Acacia* said by Gray to be the name of an Egyptian species, but Wood derives it from *akaso* meaning "to sharpen" in allusion to its spines, while Britton says the name means a point or thorn. According to Gray, *Cassia* is another name of uncertain derivation, but Wood, who is usually more discriminating in such things says it is from the Hebrew *Katzioth*. *Cercis* is said by one authority to be the name of the oriental Judas tree which indicates nothing. Another, and probably the correct derivation, is from *Kerkis* a weaver's shuttle in allusion to its pods. *Sophora* is the ancient name of a plant allied to our present species, according to Linnaeus, and Britton adds that it is from the Arabic for yellow. The present writer, not being familiar enough with the ancient languages to have an opinion, presents these suggestions for what they are worth. *Arachis* (from *aracos*), and *Ulex* are ancient names used by Pliny. *Cytissus* is supposed to be an early Roman name for a plant which this one resembles, *Anthyllis* is an old name used by Disocrides, *Lathyrus* is the name of a Grecian plant mentioned by Theophrastus, *Lotus* is a name from the ancient Greek, and *Astragalus*, taken from the same tongue, denotes some unknown member of the Leguminosae. *Sesbania* is the Latinized form of *sesban* reputed to be of Arabic origin.

Of generic names derived from some characteristic of the flower, we have *Stylosanthes* from two Greek words meaning style or column, and flower, *Centrosema* from *kentron* a spur in allusion to the corolla, *Oxytropis* from words meaning sharp and keel, and *Petalostemum*, more

properly spelled *Petalostemon*, in allusion to the united petals and stamens in this genus. *Amorpha* means deformed or without shape as the flowers appear to be because of the absence of four petals. *Desmanthus* comes from words meaning bundle and flower in allusion to the numerous stamens. *Coronilla* means a little crown either because the flowers were used in garlands or because they are arranged in crown-like circles. *Hedysarum* comes from *edos* "sweet", and *aroma* "smell" and *Rynchosia* is from a word meaning beak and refers to the shape of the keel formed by the two lower petals of the flower. *Strophostyles* is formed from words meaning turning and style or column, and alludes to the form of the pistil.

The most interesting plant names are naturally those which are suggested by some peculiarity of the plant, thus *Aeschynomene* is variously translated as "being ashamed" or "to be modest" because the leaves of the species in this genus close when touched. The species of *Mimosa* have the same habit and the name is derived from *mimos* "a buffoon" because, as Wood suggests "the leaves seem sporting with the hand that touches them". *Lupinus* is from *lupus* a wolf "because the plants were thought to devour the soil". In reality the lupines not only thrive in poor soil but actually enrich it, a fact which is now widely appreciated. The inflated dry pods in which the seeds rattle has suggested the generic name for *Crotalaria* from *krotalon* a rattle. The rattlesnake genus *Crotalus* has the same origin. *Genista* is said to be the Celtic *gen* a bush. The name might originally have been applied to any small bush but *gemista* is so much the bush in certain regions as to have usurped the title. A line of English kings, the Plantagets, is reputed to have been named for this *planta genista*.

Baptisia is from the Greek *bapto* meaning to dye and was given to this genus of plants because some species yield a poor grade of indigo. From the same word comes baptize which instead of dyeing ought to leave the candidate whiter than before! The woad is a British species of *Baptisia* with which the ancient Britons dyed their bodies green. *Thermopsis* is said to be formed of *thermos*, a lupine, and *opsis* like. *Medicago* is the name of the alfalfa genus and is said to be so named because the plant came to Greece from Medea. *Psoralea* is from a word meaning scurfy in allusion to the glands or dots on the leaves while *Tephrosia* is from *tephros*, ash colored or hoary. The genus is sometimes called *Cracca*, the latin name for vetches. *Glycorrhiza* is from *glycos* sweet and *rhiza* root, a most appropriate name for the licorice. *Phaseolus* is said to be the ancient name of the kidney bean and Wood says it means a little boat in allusion to the shape of the pods. *Desmodium* is from *desmos* a bond or chain and is said to have been given in reference to the jointed pods though the way these pods cling to one's clothing also suggests a bond. *Amphicarpa* means "both fruits or all fruits" because the plants have two kinds of flowers and fruits, one above and one beneath the soil. *Dolichos* means long. It was formerly the name of some unknown legume and is now applied to the genus which bears it in reference to the pods. *Galactea* is from a word meaning milk. Some species were reputed to have a milky juice, but this is doubtful, as Gray suggests.

The genus *Apios*, is from a word for pear (Gray spells it pair), probably on account of the shape of the tubers. The word *Glycine*, by which the genus is sometimes known, is from the Greek for sweet and apparently not very appropriate. *Gymnocladus* is from *gymnos*, naked and *klados*, branch, in

allusion to the stout branches with leaves only near the tips which thus appear to be naked. The same word for branch, and a word for brittle, forms *Cladrastis*. The clover genus, *Trifolium*, scarcely needs definition as most readers will recognize the words three and leaf in the name. *Melilotus* the sweet clover genus is from *mel*, honey and the ancient name lotus. *Parosela*, by which the species of *Dalea* are sometimes known is an anogram of *Psoralea*. Various other names have been given to certain of the genera in this family, but all within our limits that are recognized by the International Code are included in the foregoing notes.

AN EXCURSION IN THE SAN GABRIELS

By GEORGE L. MOXLEY

Having an extra holiday because the Forth of July came on Monday this year, Mr. Robert Kessler and the writer determined on a trip farther back into the San Gabriel Range than we had before had time for. By trolley and auto stage we went by way of Pasadena; up the Arroyo Seco Canyon and then walked about four and a half miles to Switzer's Camp where we spent the night. Early Sunday morning we started for Pine Flats, via Barley Flats, a distance, according to signs posted along the way, of about seventeen and a half miles, but to one walking over mountain trails apparently a half more. Monday the return journey was made by way of the Trail Fork Canyon, the West Fork of the San Gabriel River, around San Gabriel Peak, Mt. Markham and Mt. Lowe, to Alpine Tavern, where we took the trolley for Los Angeles.

In the lower Arroyo Seco the canyon sides are covered with the usual chaparral of chamiso, or greasewood (*Adenostoma fasciculatum*), not the greasewood of the plains but

a member of the Rose family, having small linear fascicled leaves and small white flowers in rather large panicled racemes; wild buckwheat (*Eriogonum fasciculatum foliolosum*), which also has small fascicled leaves and whitish flowers in terminal cymose umbels; scrub oak (*Quercus dumosa*) and other shrubby growth. The canyon floor is shaded by alder (*Alnus rhombifolia*), live oak (*Quercus agrifolia*), sycamore (*Platanus racemosa*) and occasionally other trees. The flowers that claimed our notice as we passed along were *Godetia Dudleyana*, now in full flower and making a fine show of pink flecked with purple; wild Canterbury bells (*Phacelia Whitlavia*), with their deep blue bells; large-flowered phacelia (*P. grandiflora*) with its white to lavender rotate corollas; *Antirrhinum glandulosum*, with its tall spikes of rose colored flowers; *Gilia Grinnelli*, a slender plant with loosely few-flowered branches, the corollas somewhat lilac in color with a purple tube; sticky monkey flower (*Diplacus longiflorus*) with tubular-funnelform flowers, the upper lip two-lobed and the lower three-lobed more or less crenately toothed; and the tree poppy (*Dendromecon rigidum*). Occasionally we saw *Lilium Humboltii* but the full glory of this magnificent lily is only to be found at higher elevations and especially where it is more unusual for excursionists to come. The reason for this is obvious. It grows in loose rich soil, never in bogs or wet places. The stems are often more than four feet high and sometimes bear forty to fifty flowers, the segments of which are two or more inches long strongly revolute and reflexed, reddish-orange with maroon spots.

The upper part of the Arroyo Seco runs approximately east and west and meets the upper end of the West Fork of the San Gabriel at a "saddle" almost directly back of San Gabriel Peak. The chief trees of this portion of the Arroyo are canyon oak (*Quercus chrysolepis*), laurel bay (*Umbel-*

lularia californica), a fair sized tree with lanceolate leaves having the characteristic bay odor and flavor, and broad-leaved maple (*Acer macrophyllum*). The big cone spruce (*Pseudotsuga macrocarpa*) is found in suitable situations on the canyon sides. The more showy flowers found along here were the so-called scarlet honeysuckle (*Pentstemon cordifolius*), with scandent stems, cordate leaves and scarlet tubular flowers. It is usually found below 3000 feet and replaced above that elevation by *P. ternatus* which has much the same sort of flower but the leaves are lanceolate and in whorls of three. *Lilium Humboltii* was here in fine condition some of the stalks being at least five feet high and having 40 or more flowers and buds. On the dry ridges was *Calochortus Weedii purpurascens*, one of our finest Mariposa tulips. The sepals are narrow and long-acuminate, the petals cuneate-obovate, purplish splotched with brown and densely hairy within.

From the above mentioned saddle, the trail winds in a continuously upward but not difficult grade to Barley Flats. Along this trail we found a very fine specimen of broom rape (*Orobanche tuberosa*) having a dense purplish bloom throughout. This is parasitic on *Adenostoma*, has a bulbous base, fleshy stem and is often branched at the inflorescence. The flowers are rather tubular, somewhat bilabiate, yellowish to purplish. Most of the specimens observed were past blooming, dry and more or less insect eaten. Along the upper portion of this trail we found some of the most striking specimens of *Diplacus longiflorus* we had seen anywhere. The clumps were often one and a half feet in diameter and the colors ranged from a creamy white to a salmon buff. Frequently a clump of the lightest color would be alongside one of the very dark making a very effective contrast. At about 5300 feet the trail passes over another saddle to the north side of

a rounded summit which is a little less than 5600 ft. elevation. On this north slope we found some very fine specimens of *Heuchera elegans*. This little alum-root grew at the base of rocks and trees. It has a thick rootstock, roundish-cordate basal leaves and cymosely branched panicles of small flowers with pink calyx and white petals. Here also were many magnificent clumps of *Pentstemon Palmeri*, some of them nearly three feet in diameter and two feet high. The large creamy lavender flowers made a very fine show. Almost equally fine was the display of *Nama Parryi*, some of the stalks of which were five or more feet high and carried spikes nearly two feet long of purplish funnelform flowers.

Coming out on Barley Flats, which is an open rolling ridge, having a general elevation of about 5500 ft., covered with grasses and forested with big cone pine (*Pinus Coulteri*), we found various patches of color. Portions were quite white with *Linanthus androsaceus*, a slender plant with palmately linear-lobed leaves and salver-shaped flowers with a very slender tube and oval lobes. The flowers vary from white to pinkish. Other parts were deep orange with *Chaenactis glabriuscula*, while scattered all about were clumps of *Lupinus Hallii*, plants of *Calochortus invenustus montanus* with pale lavender flowers, and mats of *Eriogonum Kennedyi* (?). This last was not yet in flower, which accounts for the slight uncertainty in its determination, but its interest for this trip lay in its being the host of several plants of the slender broom-rape (*Thalesia fasciulata*). Many smaller and less massed flowers were scattered all about, although the season was rather late.

Leaving Barley Flats the trail took an eastward trend and we travelled about five miles along a dry ridge having very little of especial interest. About the only color to relieve the monotonous gray-green of the chaparral, which is here

composed largely of a manzanita (*Arctostaphylos tomentosa*), was an occasional clump of woolly blue curls (*Trichostema lanatum*), the Romero of the early Spanish settlers, and more of the *Diplacus* we have before mentioned. We now descended to a nice little stream bordered with willows and grasses where we found the Dogbane (*Apocynum cannabinum*) quite common. Here we also collected some fine spikes of false lady slipper (*Epipactis giganteuni*). "The casual observer alludes to this plant as a 'Lady's slipper', and he is not so very far wrong, for it is closely related to the *Cypripedium*, and resembles it much in habit, in the aspect of its leafy stems and in the general form of its blossom. But instead of having its lip in the form of a sac, it is open and curiously jointed, the lower portion swinging freely, as upon a hinge. When this lid is raised, one can fancy some winged seraph or angel enshrined within, but when lowered the resemblance is more of a monk bowed in meditation. * * * Dull purples and greens predominate, though the lip is tinged with orange or yellow."

From this crossing it was a hard, dry, hot, sandy climb to Pine Flats, which is much like Barley Flats in general appearance and about the same elevation, but the forest is of yellow pines (*P. ponderosa* and *P. Jeffreyi*). Two very common plants on the rolling ridges were *Balsamorrhiza deltoidea* and *Lupinus Grayi*. We found a few belated snow plants (*Sarcodes sanguinea*) under the pines. This saprophytic ericaceous plant is very striking with its reddish fleshy, scaly spike and deep red campanulate flowers. Some plants that were of considerable interest to us, in that we had not previously collected them, were the St. John's-wort (*Hypericum formosum*), *Pentstemon labrosus* and *Calochortus paludosus* (?). This last grew along the stream and

in moist meadows which seemed to us very unusual places to find *Calochortus*.

On the return trip from Pine Flats to the ridge we had traversed the day before we collected *Oxytheca trilobata*, a polygonaceous plant with spiny bracts and three-lobed white petals, *Orobanche tuberosa* and *Hulsea vestita*. Reaching the top of this ridge we turned south into the Trail Fork of the San Gabriel, otherwise known as "Shortcut Canyon", where the vegetation was much like that of the upper Arroyo Seco. At one point we noticed a patch of *Epipactis* perhaps two or three square feet in area in which were eighteen fine spikes. The display of *Lilium Humboltii* in this canyon was also very fine.

Coming out of the West Fork we found ourselves farther from the trolley than we had anticipated with four miles of hot sandy trail to be traversed before climbing out of the canyon for another five miles of ups and downs, principally ups, so we did not try to make any further collections. Some plants of *Zauschneria* in flower were noted, however, rather earlier than is usual for this handsome scarlet fuchsia-like flower to appear. It was not collected but we noticed in passing that it is of a form that has been tentatively referred to *Z. latifolia* but which will have to find another name, since it is very distinct from typical *Z. latifolia* (Hook.) Greene.

Thus ended a very interesting, if rather strenous, trip. To enumerate all the plants seen would require too much space, so only some of the most noticeable have been mentioned. It may be noticed that few "common names" are given. Many of our California wild-flowers have not yet entered enough into the life of the people to be blessed with names other than those bestowed upon them by botanists.

ROCKY MOUNTAIN PLANT NAMES

BY MRS. M. E. SOTH

NATURALLY many plants of the Ranunculus family as well as of others are called "western" because they differ only slightly from similar plants of eastern range. Western virgin's bower (*Clematis ligusticifolia*), western anemone (*Anemone occidentalis*) and western columbine (*Aquilegia formosa*) are familiar examples. Thus, too, "wild" was an easy way to distinguish some indigenous plants from introduced species similar in appearance or characteristics. Introduced species like *Ranunculus acris* and *R. repens* have retained their well-known names as have those familiar often homely forms that are transcontinental in habitat. Round-fruited, long-leaved, small-flowered and others are mostly literal translations of their Latin names and one has but to consult the manuals to find them.

There are, however, a few distinctive names that designate certain Rocky Mountain members of the Ranunculaceae. *Delphinium Geyeri* is "poisonweed," or "poison larkspur," because the large tuft of root leaves, springing up before other forage grows, is often eaten by stock with fatal results. Larkspur is also called "rabbit-ears" by many school children, the name being of generic application.

Aquilegia coerulea, being the State flower of Colorado is quite generally called "Colorado columbine" while *A. chrysanthia* is golden columbine as its name indicates. Our mountain species of *Caltha* bears the distinctive name of "elkslip,"

the *Thalictrum* is fittingly dubbed "maid-of-the-mist" and my own children call the little creeping crowfoot, *Ranunculus cymbalaria*, "ghi plant" meaning melted butter, a name which they themselves adapted from the tale of little black Sambo.

The Westerners, as a rule, prefer to divide the genus *Clematis* into three parts. We call the small white-flowered varieties, "wild or white clematis," "traveller's joy or "pipe stem." The upright herbs of the *Viorna* type are known variously as "leather flower," "vase-vine," "headache weed," or (in fruit), "lion's beard" or "old man's whiskers." The vines with large purple-sepalled flowers are called "bell-rue" or "purple virgin's bower," sometimes "western virgin's bower."

ADDITIONAL NOTES ON PLANT NAMES

THE further one delves into the subject of vernacular names, the more he is impressed with the uncertainty that underlies much of the subject. One would think that if the derivation of a plant name is known at all, there ought to be something definite about it, but this is far from the case. Two or three derivations are often met with, any one of which would meet the requirements by itself, but coming several together they offer a fine exercise in careful discrimination. Something of this nature is connected with the name of "knout berry" applied to *Rubus chamaemorus*. Professor J. C. Nelson writes that the recognized derivation is from Canute or Cnut and really means "Canute-berry" after an early English king. It has also been suggested that the name was derived from a whip of the same name, popular in Russia, which was constructed of leather thongs into which bits of iron were twisted to make it more efficacious. The first derivation is regarded as having the weight of authority but one wonders

how the monarch became connected with the berry. One tradition has it that King Canute was once saved from starvation by eating the fruits of this species. The fact must not be overlooked in this connection, however, that in the north of England, knot means a hill and it is quite possible that the name may have been given the plant for its habit of growing in elevated places. According to Prior the knotty joints of the stems of this plant gave it its common name.

Among the names applied to *Trillium sessile* and *T. recurvatum* we failed to include "beefsteak" which is commonly used in parts of Illinois. The reference is of course to the dull red flowers not unlike raw beef in color. The name of "true-love" applied to *T. erectum* is explained when it becomes known that this name was long ago applied to *Paris quadrifolia* of Europe because the four leaves are arranged "in the form of a true-love knot." *Paris* being a member of the Trilliaceae, some ancient chronicler simply transferred the name to a species with three leaves, to the consequent mystification of later students.

In connection with the notes on the lilies, it may be of interest to know that *Lilium martagon*, the true "turk's cap lily," is regarded by many as the "lily of the field" spoken of in the Bible. It is probably the original also of that hyacinth which is fabled to have sprung from the blood of a youth killed by Apollo.

OWNERS OF COMPLETE SETS

The list of owners of complete sets of *American Botanist* recently published in this magazine, indicates that full sets are not as common as we had imagined. Often a missing volume or even a single missing number keeps a set from being complete. Since we have not a single extra copy of several volumes, it is certain that many sets must remain incomplete unless the desired numbers can be picked up elsewhere. There are now less than 25 sets offered for sale and only 11 more that are complete from volume 1 to volume 22. When the World War began, we endeavored to aid in eliminating waste by reducing our output to cover subscriptions and complete volumes, only. In consequence we have not an odd number of any volume later than 1914. In the past year we have had to refuse many who asked to begin their subscriptions with some of these late volumes. Eleven persons who have sets of the magazine, beginning with volume 23 can still fill these sets by ordering the early volumes at \$12 for the set, but there are only 11 opportunities of this kind left. We have also a very few sets of volumes earlier than 1914 of which we shall be glad to quote prices upon application. We print on another page a list of the names of those who have notified us that they possess complete sets, or who have purchased sets since the first list was published. The State College of Pullman, Washington, lacks only the number for August 1920. Any reader who can spare this number will confer a favor on the college by forwarding it. Possession of a complete set of this magazine is now certain to become a mark of distinction.



NOTE *and* COMMENT



VALUABLE FERNS.—Nowadays it is customary for the florist to include with every order of cut flowers one or more fern leaves and we accept this added greenery without a thought as to its source. Doubtless a good many people suppose that the florist grows it as he does the rest of his stock, but the truth is the leaves are collected from living plants growing wild in our nothern forests. Since the demand for fern leaves is constantly growing, it is evident that certain species of ferns will become rare unless the greatest care is taken to collect the leaves without harming the plants. Ferns are not a product of the soil itself and can no more thrive without their leaves than could an animal deprived of its digestive organs. If the leaves are collected late in the year and care is taken to leave the root-stock uninjured, it is likely that little harm will result, but if collectors are allowed to uproot the plants and tear off the leaves there will soon be no ferns to collect. Some idea of the proportions to which the trade in fern leaves has grown may be had from an item in *Horticulture* which mentions that a single company has recently constructed in North Adams, Mass., a storage house for ferns costing \$40,000 and capable of storing forty-two million fern fronds. The ferns commonly used are forms of the spinulose shield fern (*Nephrodium spinulosum*), though others are used to some extent, notably those of the Christmas fern (*Polystichum acrostichoides*) which are known to the trade as dagger ferns.

COMMON NAMES FROM SURNAMES.—Prof. J. C. Nelson makes a further addition to the list of common names derived from surnames which was published in the August issue. This is "Johnson grass" (*Holcus halapensis*) which has some value as a forage plant and is grown in the South though it oftens proves a nuisance because of its running rootstocks which makes it difficult to eradicate it from a piece of ground when once it has become established. The grass was named after a certain W. Johnson of Alabama who seems to have introduced it into his State between 1840 and 1845. Little seems to be known about this particular Johnson. Possibly he may have come to shun publicity and to regard his namesake with aversion since it threatened him with notoriety instead of fame.

FRUITS OF THE FLOWERING QUINCE.—It is probably unnecessary to observe that all quinces produce flowers though that scarlet-flowered shrub of early spring often bears the name given it in our title. It is more properly the Japan quince (*Cydonia Japonica*). It is probably called "flowering quince" to distinguish it from the garden species which though a beautiful sight when covered with its pink rose-like flowers, is seldom grown for ornament. The flowering quince has still another claim to its title from the fact that it seldom bears fruit. Many people imagine that it never does so. As proof that it may fruit on occasion we have a fine specimen more than eight inches in circumference, and therefore approximating the fruit of the garden quince in size, which was sent by Mrs. O. A. Runyon, Cattellsville, Kentucky. Mrs. Runyon writes that last spring a shrub of *Cydonia Japonica* in her grounds was thickly set with fruit but that a late frost caused all but four to drop from the plant. Those that remained matured October 12th. The

fruit is a clear yellow-brown and not greenish-yellow as Bailey's "Cyclopedia" describes it. No reason has ever been advanced to account for the lack of fruit on this species, but the reason may possibly be found in the sensitiveness of its carpels to frost. Although it blooms early, its fruiting parts may not be entirely hardy. There is still another species of *Cydonia* cultivated in the South that is not certainly hardy north of the Ohio Valley. The fruits of all quinces are edible and may be used for jellies and marmelades. As a matter fact, there is no true marmelade that is not made from quinces for the word marmelade itself comes from *marmelo* the French word for quince!

STARTING FERN SPORES.—Fern spores, as everybody knows are produced in great abundance and yet new fern plants are not usually numerous. There are many vicissitudes in the life of a sporeling and few come to maturity. The spores are so exceedingly minute and the conditions for growth are necessarily so exacting that young plants are easily discouraged. Those who grow ferns from spores find that great care must be taken in preparing the soil. Usually it is sterilized by baking and even then other low forms of life may overrun the young plants before they fairly get started in the world. Often the spores are sown on a block of peat which is kept moist and sheltered from the sun and wind. Noticing how frequently sporelings are found on the outside of the flower-pots in the greenhouse, some growers stop up the hole in the bottom of a pot, fill the pot with water and sow the spores on the outside. The water seeps through just fast enough to give the proper amount of moisture. An improvement on this method is to hollow out one side of a soft brick and fill the hollow with sterile soil upon which the spores are sown. The brick is then placed in a saucer of water and "kept close,"

as the grower phrases it. This method of growing plants may also be followed in the case if minute seeds which are difficult to start in ordinary seed pans or flats.

HAWTHORN VS. THORNAPPLE.—Dr. J. W. Peroutky, Merrill, Wis. writes that throughout northern Wisconsin he has never heard the name of haw or hawthorn used for species of *Crataegus*. It is invariably thornapple. It might be interesting to know how frequently the other claimant to the title of thornapple, *Datura stramonium*, is called by this name. The plant has several names but Jimson weed is the only name we have ever heard actually used in conversation.

PRAIRIE GENTIAN.—While some rare wildflowers are comparatively easy to colonize under ordinary garden conditions, others are very difficult and often utterly refuse to do well until all their wants are complied with. This is the case with the Prairie gentian as well as other choice members of the Gentian family. Whether grown from seed or transplanted, if placed in the open bed the chances are that it will be lifted out of the ground by the freezing in winter. On the prairie or in the meadow surrounded by a network of grass roots holding it down, it winters safely. The plant is commonly known as alkali lily and prairie gentian. It is a beautiful plant wherever grown but its full splendor is reached only when growing in masses in alkali soil. It is common, there, to find twenty or more long-stemmed flowers on one stalk and rarely plants are found bearing flowers of shimmering translucent gold, or with snow-white blossoms. A glance at the root system of a plant in full bloom should be sufficient to give the reason for its extra care in cultivation. One plant, bearing more flowers than one would care to place in a single vase at one time, will be found growing from a root much smaller in size than any ordinary plant.—*Mrs. S. B. Walker, Denver, Colorado.*

SURNAMES FROM PLANTS.—The list of surnames derived from plants appears to be much longer than might be inferred from the list in a recent number of this magazine. We are indebted to Rev. George H. Tilton, Melrose, Mass. for a considerable list of additions and others have been supplied by Miss Adella Prescott, New Hartford, N. Y. The additional names, alphabetically arranged are given here. It may be well to caution our readers against a too ready acceptance of some of them. Similarity of sound is not a safe indication of derivation in all cases and it is practically certain that several of these names have no connection with plants. It would often require much research to prove this, while the origin of others may be more easily known. This is the list: Abele, Alders, Almon, Anise, Aster, Avelin, Aven, Basil, Bay, Bean, Beech, Birch, Blight, Branch, Bramble, Brier, Brush, Brumel, Bush, Burnett, Burrage, Campion, Capers, Cedar, Cherry, Clary, Clover, Comfrey, Cornel, Coffey, Cotton, Cress, Cudworth, Currant, Daisy, Dill, Elder, Elms, Fennell, Flagg, Flaxman, Furze, Garlic, Gourd, Greenwood, Hay, Hazel, Hedge, Holly, Holm, Ivy, Kale, Kane, Knott, Lemon, Lichin, Linn, Linden, Ling, Lupien, Mallowes, Manna, Maple, Millet, Mullen, Nettles, Nutt, Olive, Onion, Peach, Pear, Pease, Pepper, Pink, Plum, Planten, Poppe, Savory, Sprout, Sycamore, Tansey, Thistle, Thym, Towe, Tree, Twigg, Vine, Violette, Weed, Wickens.

A LONG TIME WITHOUT WINDING.—Most people have the impression that the common four-o'clock (*Mirabilis jalapa*) of our gardens is an annual but this is a mistake. The plant is a perennial in its native haunts and in less favorable latitudes will show its true nature if dug up and protected from the cold of winter. Some plants of this species in the writer's possession are at least seven years old and as thrifty

as ever, single plants spreading over a circle nearly six feet in diameter. A remarkable instance of the tenacity with which this species clings to life was found in one plant which was overlooked in the spring of 1920 and which did not get back into the ground again until May 1921. After nineteen months without soil or water it grew promptly and has since flowered profusely. A further proof of the hardiness of the four-o'clock is found in the fact that some plants left out in the ground without protection during the recent mild winter, came through unharmed in the latitude of Chicago.

TRIBULUS BECOMES A TRIBULATION.—In the days when knighthood was in blossom, some ingenious blacksmith invented a devilish instrument called a caltrop which consisted of four spikes so arranged that no matter in what position placed, one of them projected upward. When things looked darker than usual for the knights, they often saved their hardware by strewing their retreat with caltrops. These penetrating the feet of their foe's horses effectually held them in check. As in so many cases, however, nature seems to have thought of the scheme first for the species of *Tribulus* are equipped with fruits that are pretty good likenesses to caltrops. The plants are originally from Europe but they have escaped to America and thrive especially in our West where they strew the ground in just the right position to interfere with the automobile traffic. According to the United States Department of Agriculture, they produce as effective punctures as ever a man-made caltrop did. The plants lie flat on the ground and are not easily eradicated by the usual means. Tourists call the plant "devil's bur", "puncture vine" and "automobile weed." It was formerly known as "ground-bur."

PLANT HAIRS OF HONEY LOCUST.—W. B. McDougal has found that root-hairs of honey locust (*Gleditsia triacanthos*)

and various other related species are not as evanescent as these structures usually are. Almost as soon as produced they are reported to develop thick walls and remain on the plant as long as does the epidermis from which they grow. It is suggested that such thick-walled root-hairs are xerophytic structures and indicate that the plants equipped with them are adapted to life in dry regions. Whatever their cause they evidently prevent the entrance of parasitic or symbiotic fungi and so such trees have neither mycorrhizas nor bacterial nodules such as most other Leguminosae possess.

MAIDEN HAIR TREE.—Permit me to offer a slight correction in an article in your last number (p. 23) concerning *Ginkgo*. The union of sperm and egg takes place about Sept 1, at Tokio according to Hirase's original paper, and at the same time at Philadelphia where I have followed the process. At this time the seeds are still on the tree. Ikeno later showed that this stage occurs on the tree, before the seeds fall. The embryos mature about Nov. 1 at Tokio and at Philadelphia. Hirase says that the seeds may or may not fall before this time. At Philadelphia they had fallen. Does any body use the name "maiden hair fern tree?" We are accustomed to the name "maiden hair tree."—Prof. Henry S. Conard, Grinnell, Iowa. ["Maiden hair tree" is probably more commonly used than "maiden hair Fern Tree," and yet it is apparent that the latter is the proper name. This tree is so named because it is like the maiden hair fern, not like a maiden hair! The fern is so named because the black roots, like hair, were supposed, according to the "doctrine of signatures," to be good for falling hair and the plant was actually used in "syrup of capillaire." Common names, however, are not based on logic or authority; they are the names commonly used; therefore this tree seems to be the Maiden hair tree.—Ed.].

LONG RANGE WEATHER PREDICTIONS:—When an English scientist announces that it will be warm in Cairo, Egypt, tomorrow since it is cold in London today and that the rainfall will be unusually heavy in England this winter since it was unusually light in Cuba last summer; when another says that a light rainfall in Chile during the period from May to August will be followed during July to October by more than ordinary floods on the Nile; when a Japanese mathematician says that the rice crop in northern Japan will be large this fall since the barometer was unusually high last spring over China; when the scientists begin making long-range and curiously disconnected forecasts as these, it would seem that they are beginning to understand something of how this complicated atmosphere of ours works. * * * * Many such correspondences between weather happenings in widely separated parts of the world have been shown. The rainfall of the central United States shows a direct correspondence to that of central South America and both show an inverse relation to the rainfall of Australia. A forecast of temperature at Berlin in March and April is possible at the end of December from the temperature of Christinia, Norway. When the April temperature at Irkutsk, Siberia, is higher than the normal, we may expect with a high degree of probability that the temperature of San Francisco in the following July will be abnormally low and conversely. The higher the barometric pressure in the Argentine and Chile during March and April, the greater will be the Monsoon rainfall of India the following July and August.—*Thomas A. Blair in Scientific Monthly.*

THE INDUSTRIOUS ANT.—Travellers through our Southwest cannot have failed to notice the over-sized ant-hills scattered liberally over the plains. The casual observer notes the cone-shaped hills like small volcanoes, each surrounded by a wide circle of cleared ground, but unless he carefully examines

them, he may fail to discover that the ants are not content merely to build up symmetrical hills; they finish the job by covering the exterior with more or less ornamental material. Sometimes this consists of the fat, cylindrical leaves of the greasewood, or the berries from the one-seeded juniper, or of small stones. To obtain these ornaments, the ants apparently often travel considerable distances. When new materials are presented, the intelligent insects are not slow to take advantage of them. In the garnet beds of northeastern Arizona, the ant hills are literally covered with garnets, a fact well known to the Navajo, who secures his supplies by robbing the ants. In Laguna Canyon, also in Arizona, a still different variety of ornament was seen. Here a hill was entirely covered with the shells of small water snails, though located in a most arid spot. It seems the canyon once contained a lake with the usual complement of animal life, and the snail shells were left in a layer of peat some distance below the surface. The ants in their tunneling had evidently reached this layer and utilized the shells in place of more common material. The writer tried to make the conchologist of the party believe the shells represented an ant's kitchen midden, but without much success.

WINKLING MARY-BUDS.—Referring to the quotation from *The American Botanist* in the January issue as to whether Shakespeare's "Winking Mary-buds" meant marigold or Buttercup, it would appear that the writer overlooked the Corn Marigold, which in some parts of Shakespear's country is as common as the Corn Poppy; this is known as *Chrysanthemum segetum*, which has a variety equally common, separated in some works as *grandiflorum*, and which has flowers as large as the *Calendula*. I venture to suggest that if Shakespeare meant marigold at all it would be the above rather than *Caltha palustris*.—Arthur Smith in *Gardeners' Chronicle*

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EDITORIAL



Beginning with the next number this magazine is to be enlarged again. As usual the increase in size will not affect the price; we shall simply give our readers more for their money. In view of this fact, we trust that every subscriber on our lists will renew promptly and that they will actively co-operate with us in extending the influence of the magazine. The size of the publication from year to year is largely in the hands of its subscribers. Any marked increase in its patronage is very soon reflected in an increased number of pages. It is very certain that if our subscription list should double, the size of the magazine would double also. When you mention this magazine to others, therefore, you are promoting your own interests. In the past the publication has been cordially supported and we trust that this support will continue.

* * *

Students of plants have missed much if they have not had access to Wood's "Class-Book of Botany." Wood was not a technicist; he made few attempts to segregate or describe new species, and his name is seldom mentioned when the leaders of his chosen science are enumerated; but he was a botanist in the best sense of that term and the spirit that pervades his work has endeared him to students of plants as the more technical Manuals of Gray and Britton never will. In studying the "Class-Book" one is impressed with the author's love for his specimens and his desire to interest others in them. Modern Manuals are models of efficiency; they produce the name of an unknown plant in the most

direct way and describe every species in the most concise and accurate terms; but not infrequently a cold technical account of a species fails to give one a clear impression of it. One would scarcely recognize his friends if described in a similar way. It is at this point that Wood excels all others. His technical descriptions are models of brevity but after the technical details have been set down, the botanist merges into the plant lover and then he adds a sentence or two in our own tongue that so aptly characterizes the plant that the last lingering doubt disappears. It is this personal touch that gives life to his descriptions. Of the rue anemone, he says, "A fine little plant of early spring. Root consisting of several oblong tubers." Of hepatica, "This little plant is one of the earliest harbingers of spring, often putting forth its neat and elegant flowers in the neighborhood of some snowbank." His observations on a common violet indicates that he was familiar with the variations that later writers have seized upon for the segregation of species for he says of *Viola Cucullata* "This varies from pubescent to glabrous, from leaves reniform to ovate, deltoid, or hastate, from flowers deep blue to light blue or even white and, as now generally conceded, to the following remarkable forms" of which he describes two. He says of the sundew "A curious little plant not uncommon in bogs and on muddy shores. Whole plant of a reddish hue like other sundews and beset with glandular hairs which are usually tipped with a drop of clammy fluid glistening like dew in the sun." Of the closed gentian he writes "Flowers inflated, so nearly inclosed at the top as to be readily taken for buds and the young botanist waits in vain to see them expand." And so he passes from species to species with observations that show his deep love for the study. Unfortunately the "Class-Book" has long been out of print. The

age in which it was published—an age in which there was time for leisurely rambles afield—has given way to an age of automobiles, telephones, air ships, wireless and other means of annihilating time and distance. The world now moves too rapidly for the "Class-Book", but looking through the yellowing leaves of our own copy we are disposed to think that something precious was lost when it ceased to represent the attitude of the student toward the plant world.

BOOKS AND WRITERS

In recent years a number of facts have accumulated which indicates that protoplasm—that stuff of which living tissue is made—may itself have its youth, maturity and old age. It is well known, that seedling peonies and pyrethrums may produce single flowers at first and only become double with age. Fresh seeds of cucurbits commonly produce plants with a great amount of leaf and stem, but the same seeds allowed to age before planting will produce a much greater number of fruits. Plants transferred to our gardens from the wild are often difficult to raise from seeds but when they are once grown in that way, further crops of plants from seeds are more easily obtained. A plant which roots with difficulty from cuttings takes readily to this method of propagation after a succession of cuttings has been established. The evidence from the animal side is fully as striking. Although the scientists are inclined to scout the inheritance of acquired characteristics, there are many reasons to believe that they are wrong. Certainly modern forms exhibit characters that their remote ancestors did not possess. If these characters were not acquired at some stage in the history of the family line and since inherited, it is incumbent upon

the scientists to explain where they did come from. The fact that mutilations deliberately made upon plants or animals are not inherited proves nothing. It is not likely that useless or harmful characters would be likely to be inherited. It is upon facts such as these that Casper L. Redfield has based a little book on "Human Heredity". In it he contends that any theory of eugenics founded on the Darwinian theory is wrong. His own theory is that the inherent power in an animal increases as it is exercised and decreases as it is neglected. Granting this, it is easy to see that the greatest improvements must come from the descendants of the older and more experienced individuals. An individual cannot inherit something its parents did not possess, hence, applying these principals to the human race, the author finds that the older the parents at the time of birth, the likelier the children will be to become eminent. This proposition is backed up by an imposing amount of evidence drawn from the genealogy of eminent men. The book seems to have added something distinctly novel to the subject of eugenics and is well worth a careful reading. It is published by the Heredity Publishing Company, Monadnock Building, Chicago.

Fruit-growing being one of the chief industries of the State of New York, it is fitting that this commonwealth should be foremost in providing information regarding the various forms. To this end a series of sumptuous volumes are being issued under the editorship of Dr. U. P. Heidrick, each of which is devoted to a different group of fruits. In this series have already been published volumes on the apples, grapes, plums, cherries and peaches and a similar volume on the pears is in press. Though designed to describe only the fruits peculiar to the State, the author has wisely included all other known forms that might possibly grow in

the area and thus each volume becomes a pretty complete account of all the varieties of the fruit discussed. In the Plums for instance, there are more than 600 pages of text and nearly a hundred handsome plates, the latter unusually fine examples of color printing. In the text each species is carefully described, its synonymy given, its origin traced, and a considerable amount of additional matter of interest to the horticulturist added. It is difficult for those not actively interested in fruit growing to realize the great variety of forms that have been developed. As regards the peach the author mentions smooth-skinned and pubescent sorts, cling-stones and free-stones, yellow-fleshed, red-fleshed and white-fleshed varieties, and round, flat, nippled, cleft and beaked fruits. Added to these are white, pink and red-flowered forms, double and semi-double sorts, trees with two colors of flowers, pyramidal and weeping trees, and trees with red or brownish foliage. One of the curious forms illustrated is the peento peach from China with flat fruits only an inch long and twice as wide. In the volume on the cherries the author reverses the old idea that the generic name for these fruits (*Cerasus*) is derived from a town in Asia Minor of similar name. He states that *Cerasus* is a very ancient name for the cherry and that the town was named for the fruit. Our peaches seem to have been derived either from a single species or a group of closely related forms, the cherries may have four species in their ancestry but nearly a dozen species have given us our plums. The compilation and arrangement of the immense amount of matter included in the text reflects great credit upon the author, and the entire undertaking is especially pleasing to this magazine which originated in New York State and which is still interested in its progress.

THE AMERICAN BOTANIST

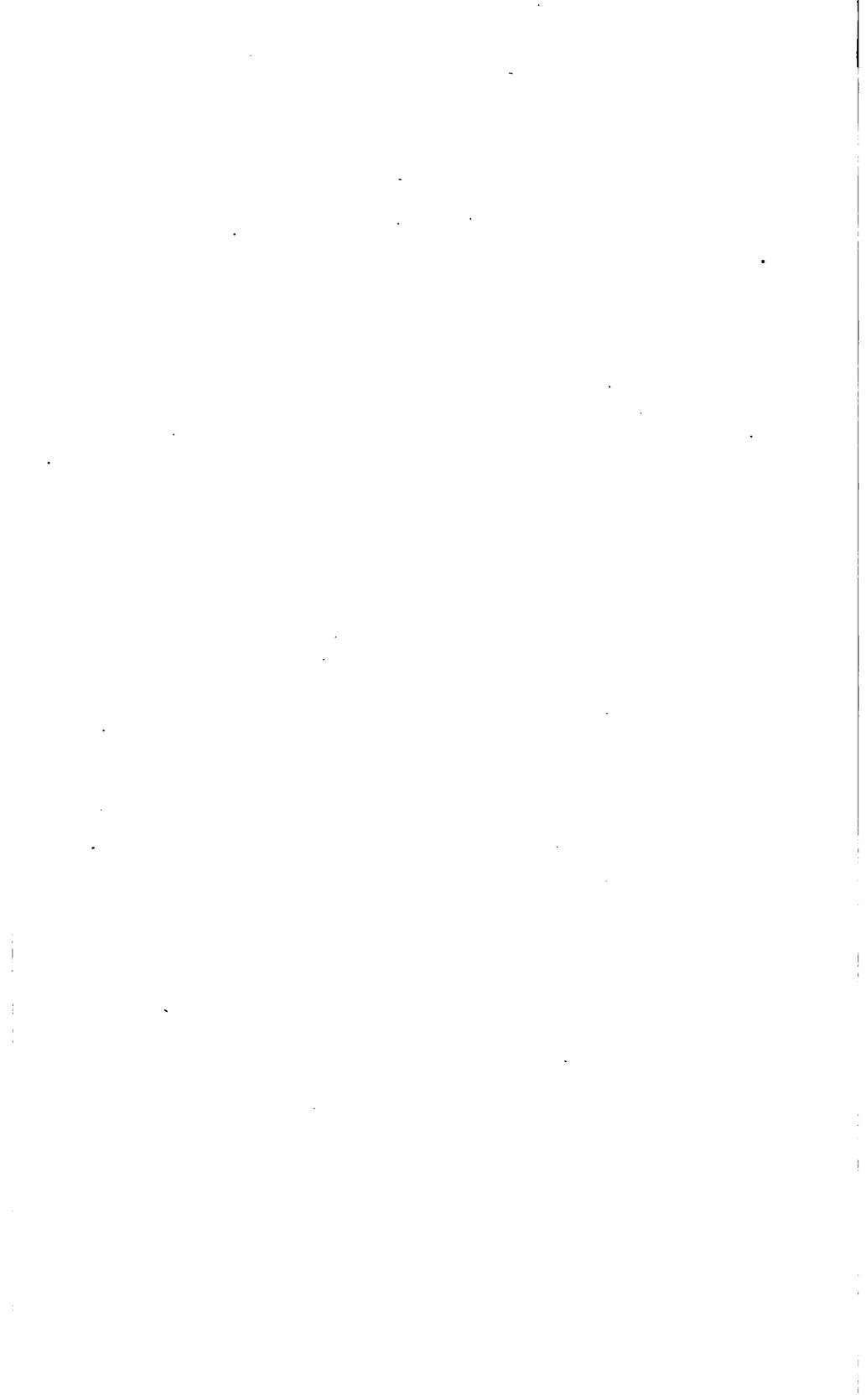
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NAVAJO EVENING PRIMROSE.—*Oenothera Chueti A. Nels.*

Courtesy Farm and Garden



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*Vestured and veiled with twilight
Lulled in the winter's ease,
Dim, and happy, and silent,
My garden dreams by its trees.*

—*Rosamund Marriot Watson.*

OLD GARDEN FLOWERS-II

THE EVENING PRIMROSES

IT is only in some old-fashioned garden where the owner has time and inclination to bother with them that one is likely to find the evening primroses. The fact that many of them are biennial has much to do with their lack of popularity for it is not always that one cares to wait two years for the seeds he sows to produce flowers, or to make new sowings, each year, to keep up the supply of bloom. Moreover, the majority of species are, as their name indicates, evening bloomers, with their noontide of life placed at that period of the day when twilight is turning to darkness. Most of the species, however, have such cheerful and conspicuous flowers, produced through such an extended blooming season that they may be regarded as quite worth planting even if they do open only at evening. The perennial species, and especially the day blooming kinds, are, of course, among our most desirable border plants. All are easily grown from seeds.

The flowers have long been noted for opening with a celerity that makes the whole process of blooming perceptible.

Nearly all flowers open so gradually that the most careful watcher cannot say positively that he has seen the petals move but the evening primroses leave him in no such uncertainty. He may indeed be

“Startled by the leap
Of buds into ripe flowers”

as Keats expresses it. At the proper time the sepals, which during the day have covered the bud, snap directly backward in a business-like way and the sulphur-yellow petals, released from their confinement, unfold at once and seem to settle into their places with a sigh of satisfaction. The botanist, Lindley, reported that at the instant of opening, a flash of phosphorescent light may be seen, but this statement seems to need confirmation.

One of the most conspicuous examples of this rapid opening, because of the size of the blossoms, is found in the Navajo evening primrose, illustrated in our frontispiece. In summer the first flowers begin to open about twenty minutes of eight and the blooming proceeds so rapidly that one can see, not a single blossom opening, but a whole bush bursting into bloom. One is reminded of the way umbrellas begin to appear in a crowd when a threatened shower begins to descend. In ten minutes seventy-five flowers may open on a single plant. The flowers in all the species are arranged in an indeterminate inflorescence, two or three blossoms in the axil of each leaf and though they open for only a single day—or night—there are always one or two mature buds waiting to replace them at the next dawn or dusk.

The first flowers have scarcely spread before the hawk-moths find it out. Attracted by the nectar they flock to the flowers and for an hour or more are very busy; so busy, in fact, that they pay no attention to human observers provided



CHEERFUL AND CONSPICUOUS FLOWERS

they do not move suddenly. They will even visit, without a sign of fear, flowers detached from the plant and held in the hand. As the twilight deepens one may throw a beam of light on flower and moth and study both at close range. Margaret Deland has referred to the friendship of flower and insect in the lines

“And there the primrose stands, that as the night
Begins to gather and the dews to fall,
Flings wide to circling moths her twisted buds
That shine like moons with pale cold glow.”

Some interesting experiments were made with the flowers of the species previously mentioned to discover what stimulus it is that causes the flowers to open and close. Two buds picked a few minutes before the opening time and placed in water close to a bright light remained closed but when one bud was shaded it immediately opened. The other continued closed until it, too, was placed in darkness. Still other blossoms placed in a cool, dark cellar remained open for more

than three days with a life-span thrice that of their companions in the garden. Lack of time prevented experiments to decide whether heat or light has the greater effect on their closing, but from the fact that, late in the summer, the flowers do not close during the day and are no longer true evening primroses, it may be inferred that temperature rather than light may be the cause. Though there are times when the flowers remain open in the light, they are nevertheless true to their first instincts in opening first at dusk.

The evening primroses are all very much alike in cultural requirements. They are dry ground plants, often very abundant in desert regions, but almost any garden soil will suit them. Though often blooming at night, they prefer sunny situations. Our commonest species (*Oenothera biennis*) is a frequent weed in gardens but some forms of it are sufficiently attractive to be cultivated, and occasionally they are fragrant. This species, or a closely related form, is of more than ordinary interest because of the fact that from it De Vries obtained some of the best proofs of his Mutation Theory which in some respects modifies the well-known Darwinian Theory of the origin of species. The particular form he worked with is known as *O. Lamarkiana*, or occasionally it is called the variety *grandiflora* of *O. biennis*.

The finest day blooming species of the group is probably *O. speciosa*, a plant with large satiny-white flowers. The best yellow sort is said to be *O. Missouriensis* a trailer with flowers often five inches across. The yellow-flowered form oftenest cultivated in the gardens is *O. fruticosa* variety *Youngii*, which is usually called *O. Youngii* in the catalogues. Another white-flowered day-blooming form is *O. pallida*. This opens in the early morning and late in the day turns to a deep pink. Best of all it is a perennial and in time forms

attractive little colonies. *Oenothera glauca* var. *Fraseri* (*O. Fraseri* of the catalogues) is much like it in size and shape but does not turn pink with age. It is, moreover, a bad weed in some gardens, spreading so rapidly by underground runners that it may easily become a pest. It should be planted only in places where its spreading cannot crowd more desirable plants. The Navajo primrose (*O. Clutei*) is among the finest of those that open in the early evening. The flowers are often more than four inches across, of a clear sulphur yellow and borne in great profusion.



PACHYLOPHUS

Related to the evening primroses, and often classed with them, are certain plants often placed in the genus *Pachylophus*. These are acaulescent plants with rosettes of toothed leaves, resembling those of the dandelion, from the center of which spring several pure white flowers more than six inches long and three wide. These open in the early evening and by the next morning have turned pink. After the plant be-

gins to bloom it produces from one to six flowers every evening throughout the summer. It is a very handsome and attractive species.

There are probably a hundred species of evening primroses. Nurserymen and gardeners incline to place all these in the genus *Oenothera*, but botanists, noting small differences in the flowers, have at times made several smaller divisions with such generic names as *Kneiffia*, *Onagra*, *Levauvia Hartmannia*, etc. Most of the species are North American and all could probably be greatly improved by cultivation. Practically the only claims they have to our attention are their beauty and interesting habits, though the root of our common species is sometimes eaten in Europe and is said to have a flavor like that of oyster plant.

FLORA OF THE MICHIGAN SAND DUNES

BY MARY EARLE HARDY

IT is a surprise on digging into the dunes to find so much moisture under the surface of the sand, and that streams trickle, and ponds and marshes lie, in the hollows among the hills. The wide stretches of dune marshes are another surprise and their beauty is beyond expression.

We wonder that any plant dares attempt a settlement where mountains of sand are carried by the winds; where deserts stretch farther than the eye can see. Yet plants are full of courage. The dunes are battle-gounds and the student comes upon many a hero-tale among the trees and other plants of our Lake Michigan areas of driven sands.

Close to the water's are the "wave-tormented sands"

though if we were wiser we might change our phraseology seeing how the gray, glittering strand laughs in the sun. Here no plant can live. Next are the driving sands which are the sport of the winds, and these gradually merge into the stationary dunes which have been battle-fields for ages and ages, and where plants are at last victorious. Often in these battles between vegetation and the driving sands, a little bunch of dune-grass has turned the tide in favor of the plants. Dune-grass has winged seeds, is quick of growth, and a rapid colonizer. It binds the sands with its tangle of roots, catches other seeds, twigs, and leaves, and little by little forms a humus and the storm-tossed dune becomes a place of plants and a hill of trees.

Aside from the wonder that plants ever make settlements on the dunes, is the added surprise of finding desert and arctic plants in close companionship, along with those of woodland, prairie, and marsh. This is said to be the case with no other known region of the United States. In consequence of this, the dunes become wild gardens of especial interest to botanists.

The prickly pear cactus luxuriates in the dune sand and sprawling in thorny patches bears its flaming yellow flowers as freely as in its desert habitat, while twin-flowers nearby, are as delicate as their cousins above the Arctic Circle. Direct descendants of trees that grew in the hot Carboniferous age, now dwarfed to delicate herbage, fringe the sands over which trail the long runners of the *uva-ursi*—a lovely wanderer from the Arctic regions. Over them wave and bloom the slender shad-trees which Matthews, in his book on trees, tells us came down from the North with the glaciers. Sheltered by the pines and oaks, whole hillsides are covered with trailing arbutus—the Pilgrim's flower.

On the southern shore of Lake Michigan, in the very shadow of Mount Tom—a sand-dune one hundred and ninety-two feet high—is a ten-acre tamarack swamp where tasseled trees stand close together with water-loving ferns between. The fronds of the ferns reach to the height of a man's shoulder and little starry blossoms, that love to stand in water, hide among them and wear their jewels of dew.

Lupines flourish in the sand and acres are blue with their blossoms while their long ramifying roots are sewing the sands into solidity. On the steep dune banks I have found wild lilies and delicate hair-bells, swept by storms of wind that wear rocks like a graving tool, but the flowers were as beautiful and care-free, as if lifting censors and swinging bells before the face of God—and who can say they were not?

This is near the southern limit of the jack-pine and against their green, fire-weeds blaze, phloxes wave, and columbines weave their charm. "Rosy mound" is a dune at the lower extremity of the region, crowned with wild roses which are themselves thornless. Out of apparently desert sand spring four kinds of lady-slippers.

Masses of marsh-marigolds—called by an Indian name which means "to light up the swamp"—are like patches of sunshine, as are also the brilliant yellow flowers of the puccoon—another Indian name whose significance we wish we knew. The tall milkweed stalks—and they grow very tall and abundant in the sand—may seem in the twilight to be the shades of tall Pottawattami sachems who still keep guard over their ancient hunting grounds.

The bogs and marshes among the dunes are an especial part of dune-land. Imagine if you can the sweep of a dune marsh in May or June when acres upon acres are lit with the sky color of millions of wild iris flowers. And in autumn the

same marshes, as far as the eye can reach, are darkly blue with the flowers of closed gentians or ablaze with cardinal flowers.

Like the desert in general the flora of the dunes is of great brilliancy. I have only given a few imperfect glimpses of the wonderful flora of a wonderful region. Those who love the dunes will tramp over them all day with shoes full of sand but with hearts full of delight, while others not in the "cult" may curse the dunes—and miss a blessing!

THE TURTLE MOUNTAINS OF NORTH DAKOTA

By O. A. STEVENS

TO the average "tenderfoot" in North Dakota, the name Turtle Mountains is of special interest, particularly if his view of the state be limited to the famous valley of the Red River of the North. He is thankful to be assured that somewhere in the state there must be more varied typography, something different from this level receding horizon, broken here and there by a cottonwood grove, something to interrupt the convergent pair of slender lines which represent the indispensable railway.

Perhaps his recollections of geography fail to include mountain ranges in North Dakota, but even so, there may have been some thought unworthy of inclusion in some little known spot in the great west. The older resident is likely to inform him that the Turtle Mountains will disappoint him. As mountains, this is quite probable, but as an interesting dot on the Great Plains, a brief description may be of interest to our readers.

Geologically this area is said to have been once a part of the Missouri Plateau, becoming separated by long processes of erosion until it remained an island as it were, some distance from similar formations. In the glacial period the top was more or less smoothed off and a moranic covering of 10 to 200 feet left upon it.

Geographically, the "mountains" form a spot about 40 by 25 miles astride the Canadian boundary nearly midway of the length of the state. Three branches of the Great Northern Railway touch them, one at St. John on the eastern end, one at Bottineau on the southwest, and the third having its terminus at Dunseith on the south. Traveling on the so-called "wheat-line" of the "Soo" the hills are usually in view in the distance from Bisbee to Omaha. The writer's observations are from three brief trips in the vicinity of Bottineau.

The elevation of the "mountains" is 400 to 600 feet above the surrounding plain. Thus they fall considerably short of the 1000 feet necessary to qualify in the mountain class. Locally they are spoken of as "the hills." The surface, like that of other glaciated hills, is a succession of low rounded hills with intervening depressions of sizes ranging from mere potholes to quite respectable small lakes. Naturally wooded, the larger timber was early removed, and in later years much has been cleared for farming. The woods now standing are composed largely of aspen and balsam poplar (*Populus tremuloides* and *P. balsamifera*) of a foot or less in diameter. In other places ash and elm (*Fraxinus lanceolata* and *Ulmus americana*) are common while birch (*Betula papyrifera*) is frequent in suitable locations. The more open spaces are quite densely covered with shrubs, chiefly willow, dogwood, hazel wild-rose, June-berry and choke-cherry.



ALONG THE MARGIN OF THE LAKE

Lake Metigoshe, lying partly across the international boundary, provides about twelve miles north of Bottineau, a summer resort of no small importance to the surrounding country. The writer spent one Sunday (July 7, 1917) collecting near the road about half way between Bottineau and the lake. This had been graded recently, furnishing a good road through the hills. In the small hours of the morning autos began to pass on their way from the surrounding country and neighboring towns to spend the day at the lake. During the day there was scarcely a time when the hum of passing cars was absent.

This road provides an interesting cross section of the "mountains." For some three miles from Bottineau it crosses a level plain, the floor of glacial Lake Souris. Then by a gradual winding incline, it mounts some of the lower hills and continues northward toward the lake. At one point it crosses a high broad hill from which a considerable view of the surrounding country is obtained but most of the way it winds between the ponds and up and down over the lower hills. Approaching the lake a detour is made around one end,

and then it winds through the woods down to a point which nearly divides the water. At the end of this point a bridge has been constructed making it possible to return on the other side.

Driving over the same way on July 6, 1920, recent rains had brought the vegetation into superb condition, and the roadside was decorated with brilliant masses of flowers, most conspicuous of which were the roses and vetches (*Lathyrus venosus* and *Vicia Americana*). Some of the dark red roses were the most handsome I have seen, and the *Lathyrus venosus* is a truly beautiful and characteristic plant. The late Dr. Lunnell, an ardent champion of wild flowers, has described (Am. Mid. Nat. 4:431) as the most beautiful display he had ever seen a whole acre of this plant.

It seems strange that this attractive flower has not received a distinctive common name, but none has come to the writer's notice. "Wild sweet pea" is made to serve for nearly any native legume, the flower of which attains an appreciable size regardless of odor, or simply "wild pea", which applies equally well to some hundreds of plants. I have therefore proposd (Am. Mid. Nat. 7:92) "bushy vetch", a name suggested on this very trip by the ease with which it grows upright, seemingly alone, but slightly supported by small shrubs or other plants. Perhaps it may be permissible to interpret the name as referring also to its characteristic habit of growing among such plants. Growing in the open, the stems stand erect to a height of a foot or more, but where somewhat protected, clasping the finger of a neighbor, it readily reaches three or four feet and extends its dense clusters of large purple flowers. The more slender wild vetch is somewhat overshadowed, but is an ardent ally rather than competitor.

As one follows the curves of the road various types of vegetation are presented by the ever-changing contour of the ground. Some of the hills are yet covered with poplar, others have been cleared for farming. Slopes cleared of timber, still have a covering of wolf berry (*Syphoricarpos occidentalis*) and coarse herbs with occasional larger shrubs. Especially where the hillside has been cut away for the road the dogbane (*Apocynum androsaemifolium*) spreads its branches displaying its pretty little pink bells. The smaller depressions are filled with sedges and grasses, sometimes with a starry cover of fleabane (*Erigeron philadelphicus*).

The subsidence of a once larger lake has left a low ridge dividing two lakes (or are they ponds) and along this runs the road. The higher part of this ridge is a favorable place for the vetches, and occasional larger shrubs, cow parsnips (*Heracleum lanatum*), or other coarse herbs rise above the wolf berry. Coming down the hill and on the ridge, the trees give way allowing a glimpse of the lake. Some places are bordered with bulrushes from which come the sounds of coot and duck, while terns and gulls hover over the water.

The photo shows a view along the margin of one of the larger of these little lakes along the road. In the distance is the tree-covered hillside. To the left the road skirts the lake, rising slowly, then turning sharply to mount the hill. In front stretches an expanse of shore left by the retreating lake, and this displays a striking zonation. Behind the bare margin for a few feet is little but *Ranunculus sceleratus* and *Rumex persicarioides*; then scattered among these a band of tall *Senecio palustris* in full flower. Behind this, bulrushes (*Scirpus validus*) which in turn give way to a mixture of horsetail and fleabane (*Equisetum hyemale* and *Erigeron philadelphicus*). Further, are grasses and sedges, with some reeds

(*Phragmites*) and Joe-pye weed (*Eupatorium purpureum*), near the foot of the hill which is covered with the coarse herbs and shrubs. Around a near-by lake the *Senecio* was even more conspicuous, forming a brilliant golden band encircling it.

The woodland flora is mainly that of the more eastern deciduous forest as for example wild sarsaparilla (*Aralia nudicaulis*) which is abundant, but a straggler from the north is found in *Achillea multiflora*. A few other such occur. A leafy stemmed loco (*Oxytropis deflexus*) is abundant along the gravelly shore near the summer resort, and another species (*O. splendens*) occurs on some of the grassy hilltops. *Cornus canadensis*, *Lepargyreia candensis*, *Anemone hudsoniana*, *Geranium bicknellii*, *Polygala senega*, *Pyrola asarifolia*, *Ribes triste*, *Senecio eremophilus* and *Avena Torreyi* are mostly limited to this part of the state, while the beaked hazel (*Corylus rostrata*) is the common one there.

Weeds are not absent. The dragonhead (*Dracocephalum parviflorum*) which is so at home near the woods, is common. False flax (*Camelina sativa*) seemed especially common along the road, and Canadian thistle (*Carduus arvensis*) was seen around the edges of nearly every pond. Apparently the seeds had blown into the water, and cast upon the shore had found a congenial habitat. By the same way has come the more recent pest, perennial thistle (*Sonchus arvensis*.)

BOTANY FOR BEGINNERS

BY WILLARD N. CLUTE

THE young lady who said she liked everything about plants except botany expressed the sentiments of a great many people. We admire the brilliant colors and graceful forms of the flowers, we ornament our grounds and decorate our dwellings with the finest specimens, we use them in quantity for all sorts of festive occasions, and most of us realize that we depend upon vegetation for food, shelter and clothing, but when it comes to the science of plants, we too often regard it as concerned primarily with a multitude of uncouth and outlandish terms quite detached from the plants themselves and of no use to anybody except a few peculiar individuals who happen to like that sort of thing. This opinion is one that the scientist himself often unconsciously fosters, for his life in herbarium, classroom or laboratory inclines him to exalt book knowledge and indoor studies above a familiarity with plants in the field. "Where have you been" asks the prim and severe tutor of her youthful charge. "Out in the garden watching a rose unfold" replies the child. "Well, don't you know you ought to have been in here studying your botany lesson?" inquires the conscientious but purblind teacher.

The world has long poked fun at its conception of the botanist whom it usually represents as an amiable elderly gentleman, armed with vasculum, trowel, manual and lens, wandering about the fields, peering at small flowers through his glass, and so intent upon his hobby as to be oblivious of everthing else. Doubtless such specimens exist but they are always so rare as to cause comment. As a matter of fact

everything that concerns plants belongs to botany. Even the successful farmer must be a good botanist though few things would surprise him more than to be told so. It is not a familiarity with, and use of technical terms that makes the true scientist; it is an understanding of, and love for, the plants themselves. It is very clear, therefore, that more botanists are roaming the countryside nowdays than are numbered on the rolls of the botanical societies.

The students of an earlier day were nearly all field botanists, attracted to the study by the beauty and marvellous structure of their specimens. Often they pursued their studies far beyond the bounds of civilization and under the greatest difficulties, sustained in the work by the pleasure derived from a discovery of the unknown, whether this happened to be an unknown species or an unknown fact. Probably a majority of such students were enthusiasts who found in botany only an avocation that might be followed in spare moments snatched from the daily grind of business and on Sundays and other holidays. Those were the days in which the professional botanist scarcely existed and the study was alluded to as the "amiable science." The modern college-bred, closet scientist has exchanged his vasculum and trowel for forceps and scalpel, and with his lens, now grown up into a microscope, studies not plants, nor even a plant, but parts of a plant. He usually looks with some contempt upon the collector and namer of plants, but there is still much to be said in favor of such studies, not the least of which is that this phase of the subject is the one that appeals most strongly to the common people.

Pretty nearly everybody is interested in field botany. I have known farmers, business-men, common laborers, housekeepers, fishermen, hunters—even cowboys and Indian trad-

ers—to leave their regular tasks and wander over hill and dale in search of plants when they were accompanied by somebody who could talk about them. Indeed, I suspect that a great part of the fishing and hunting that goes on in settled communities is made the subtle excuse for getting away again for a day among the plants. It is the custom of the ordinary man to suggest some ulterior motive for a return to nature, just as he borrows a child to take to the circus, or takes the children to the woods in spring. Deliberately to go flower-gathering would seem to the average adult much too sentimental to be countenanced.

An interest in plants, moreover, is the compelling factor in a multitude of diverse undertakings quite unbotanical in character. No matter how much the driver is interested in the speed of his car he at least chooses the more flowery and tree-shaded highways when he drives for pleasure. And those peripatetic gentlemen of the road whose sole artificial method of transportation is an empty box-car—where do they establish their camps? Always among sheltering trees if there are any in the neighborhood! The wanderlust that inspires such travellers is undoubtedly in part a response to the changes of vegetation, for like the birds, they go south when the leaves fall and are always rarest where plants are fewest. There are no tramps in the desert!

Much of the charm of bird-study is really due to the plants among which it is carried on. The bobolink's song sounds less sweet if separated from the flowery meadows over which he hovers and sings, as many a man has discovered to his sorrow after caging the bird. The whistle of the oriole from the airy branches of an elm, the mew of the cat-bird in the dewy alder thicket, the robin's song in the orchard, even the caw of the crow among the pines, is more musical because

of its plant associations. It is not surprising, then, to learn that many of the eminent botanists of the present generation trace their interest in plants to the time when, as bird students, they wandered in field and wood. One might go still further and point to the fact that the birds themselves, are good botanists. They know which species produce the edible fruits and their judgement in the matter of nesting materials and the most satisfactory locations for summer residences cannot be questioned. The wood pewee, the humming-bird and various others are great students of bark patterns and lichen decorations and reproduce them in the ornamentation of their nests. Even stranger than this some birds are known to regularly decorate their nests with fresh flowers. The purple martin is as fond of peach blossoms as the Japanese are of their cherry blossoms.

There are, of course, a few individuals—those who regard themselves as hard-head business-men or professional scientists—who would almost as soon be caught robbing a church as gathering flowers, but even these have, perhaps far beneath the surface, an interest in plants. They are not averse to going berrying, or nutting, or hunting bee-trees or gathering mushrooms. To such, the virtues of wintergreen and birch and sassafras and slippery elm and ginseng may be matters of importance and though they disclaim an interest in plants they commonly pay homage to vegetation in general by spending at least two weeks of every year in a wilderness of plants.

The automobile has done much to reduce the number of those who would ordinarily take up the study of plants. I do not now allude to the important part it plays in reducing the total of the population, but to the fact that it is so much easier and less dangerous to ride than to walk that we natur-

ally choose the more rapid method of transportation. One can have a rattling good time in the cheapest of automobiles! It is, however, difficult to stop when one once gets started. Even at ordinary speeds, the flowers trail past as mere blobs of color in the landscape and one hesitates to check the driver in his flight lest the other members of the party be annoyed. The only practicable way to study plants is on foot, though the auto need not be disdained as a means of reaching the spot where the real journey is to begin. There is much to be said, however, in favor of entire journeys afoot and I am gratified to note that the number who agree with this opinion seems to be increasing.

There is a special delight in making short cuts across fields, following the brooks, or sauntering along country by-ways where the automobile cannot go. One sees so many things that are hidden from those who must keep to the highways. It is difficult, I confess, to get the average automobile driver to appreciate this point of view. That anybody should actually prefer to walk when he can ride is incomprehensible to him. It is one of the commonest experiences of the botanizer to be offered a lift to the nearest town by well-intentioned autoists, but the wise student knows very well that one cannot successfully pursue plants with any combination of iron, rubber and gasoline. "All travelling," says Ruskin, "is dull in exact proportion to its rapidity" and this observation has special application in the case of botanical rambles.

Many things combine to make the study of plants enjoyable. Every excursion afield is a voyage of discovery in which one makes new acquaintances, accumulates unexpected treasures, and steadily adds to his stock of mental pictures which it is ever a joy to recall. The botanizer enters a new world from his very doorstep. Poking about the

hedgerows, investigating strange woodlands, exploring unfamiliar ravines, threading the maze of herb and shrub along pond and stream, he is ever on the margin of adventure. Perchance he may find a rare plant never reported from the region, or even a variety previously unknown to science. There is also the chance of his meeting with old plants that are new to him. If these larger experiences do not come his way, there is still the pleasure of finding the very first flower of its kind to open, the possibility of encountering a noteworthy variation in color or form, and the delight of discovering old plants in new settings, not to speak of the mere joy of existence when the trees are in leaf, the birds in full song, butterflies flitting over meadow and thicket, and the earth spangled with flowers.

FLORA OF THE NAVAJO INDIAN RESERVATION-II

BY AVEN NELSON

THIS short article is offered in continuance of the studies made by Mr. Willard N. Clute in the summer of 1919. The first paper was concerned with the long list of interesting though better known species representative of the Navajo Indian Reservation, and more particularly Navajo Mountain. The present one is an attempt to dispose of a few that are apparently novelties and to locate the rarer and adventive specimens. The latter with notes by Mr. Clute seem to be as follows:

67. *Perezia Wrightii* Gray. Common along the cliffs at Red Canyon near Endische.

77. *Shepherdia rotundifolia* Parry. Endische and else-

where. A very interesting shrub with round, white-woolly leaves that deserves a place in ornamental plantings.

94. *Nama hispida* Gray (?). Common at Endische. Collected also as 141.

98. *Wedeliella incarnata* (L.) ckl. Common at Red Lake.

114. *Grindelia stylosa* Eaton. Red Lake. A very sticky composite.

117. *Verbesina encelioides* Cav. var. *exauriculata* Robins. and Greenm. Red Lake and Marsh Pass.

128. *Mimulus Eastwoodiae* Rydb. In open caves growing in crevices of the rocks at some distance from the entrance. Betatakin Cliff Ruin and Navajo creek.

134. *Oreocarya* sp?

143. *Astragalus* sp.?

146. *Atriplex* sp.?

ERIOGONUM FERRISSII n. sp. Glabrous perennial with numerous di or tri-chotomous stems from a branched semi-woody caudex, 2-3 dm. high: leaves fascicled-verticillate at the nodes and tips of the stolons, 3-5 or more in each cluster (the dead leaves often persisting on the crowns of the caudex.) small, $\frac{1}{2}$ cm. long, oblong-ob lanceolate, acute at apex and tapering cuneately into the slender petiole which is almost as long as the blade except upwards where they tend to become bract-like and sessile: inflorescence mostly 3-rayed, somewhat regularly proliferous a third and even a fourth time, the raylets obscurely glandular pubescent, each terminating in a single several-many flowered involucre; flowers yellow on slender pedicels, glabrous, the segments about 2mm. long, broadly spatulate with long tapering base.

Number 10 c in Mr. Clute's Navajo Indian Reservation

collection, secured at Betakin Ruin, July-August, 1919, is the type. A less well developed specimen, from War God Spring, no. 22, at about the same time. It seems to belong in the Section *Umbellatae* but in its method of proliferation it appears different from any of the species known to the writer.

HEUCHERA CLUTEI n. sp. Scapes glabrous and bractless, 1-2 dm. high, slender, 2-4 times as long as the petioles: leaves several-many, 1-3 cm. broad, on the thickened branches of the caudex, round-cordate, shallowly 3-5 lobed, the lobes crenate-dentate, obscurely hispid with a longer bristle tipping the teeth; petioles sparsely hispid-ciliate, longer than the blade (often twice as long): inflorescence a simple and completely one-sided panicle of 10-20 (possibly more) flowers, obscurely hispid-glandular; bracts evident but small, linear; calyx roseate, narrowly campanulate, its obtuse teeth about as long as the tube; petals linear-lanceolate, acute at both base and apex, scarcely exceeding the moderately exserted stamens and styles.

Probably best compared with *H. rubescens* Torr. from which it differs in its smaller size, the complete absence of villosity, the smaller and completely one-sided panicle and relatively short pedicels, and the acute petals.

The type is Clute's no. 80 from near the summit of Navajo Mountain, moist places among the rocks of "Hidden Spring", altitude about 10,000 feet.

OENOTHERA CLUTEI n. sp. Probably biennial, the first year showing not only the usual rosette of crown leaves, but sometimes giving rise to sparingly floriferous branches from the lowermost leaf-axils. Most of the plants develop the second year as follows: The basal ascending branches develop first and are so disposed as to give a basket-like

aspect to the young plant, but later the main axis develops rapidly and overtops the earlier sparsely floriferous branches, becoming 6-15 dm. high (according to soil and moisture) : stems rather slender, greenish but tinged with red, pubescence thin, of two kinds,—short soft hairs and some stiffer whitish bristles ; leaves numerous, from linear to narrowly oblong, 5-15 cm. long, entire or sparsely denticulate, with pubescence similar to that of the stem : inflorescence a crowded corymbiform raceme, becoming typically racemose in age, pubescence as of the foliage but denser and the hirsuteness more pronounced especially upon the calyx lobes : calyx-tube slender, 8-12 cm. long (in average specimens about 10) : calyx lobes about 3 cm. or approximately one-third as long as the tube ; petals a clear fine yellow, broadly obovate, more than 3 cm. long, scarcely changed in drying : stamens and style equalling the petals, ovary short, the capsules in age only 3-3 cm. long.

This handsome species is a near relative of *O. Jamesii* T. & G. from which its precocious crown branches, its strict, slender central stem, its calyx-tube, its compact inflorescence of handsome unchanged flowers (corolla often 7-8 cm. across) and its relatively short capsule seem to distinguish it.

The type was secured by Willard N. Clute in the Navajo Indian Reservation, in Arizona, in July, 1919, at War-God Spring, on Navajo Mountain, at an altitude of about 7,000 feet and is his No. 4. Mr. Clute notes that it occurs on both dry and moist ground.

In 1920 Mr. Clute secured at the Tuba Oasis, Painted Desert, Arizona, an *Oenothera* (No. 102) that somewhat resembles it but probably may best be referred to *O. Hookeri* because of its short calyx-tube and its less noticeable pube-

scence. Mc Dougal seems to have secured the same thing near Flagstaff, July 8, 1898, his number 251.

PHLOX CLUTENA. n. sp. The herbaceous stems several from an inconspicuous but distinctly ligneous branches base, very slender, wholly simple except for the 3-flowered cyme, 1 dm. (more or less) high: pubescence fine, white and gland-tipped, throughout except on the corolla and the lower leaves (these more or less glaucous); leaves from narrowly to broadly linear, 1-3 cm. long, inclined to coriaceous with noticeable midrib; pedicels 4-10 mm. long, slender; calyx 8-12 mm. long, the very slender lobes more than half the length and evidently carinate: corolla pink, drying more or less whitish, its tube nearly twice as long as the calyx and distinctly longer than the obovate practically entire lobes.

This species is allied to *P. Stansburyi* (Torr.) Heller but lacks the rough pubescence of that and in its simple cyme, its flat leaves and slender stems is at once distinguishable from that.

It is known only from Mr. Clute's No. 18, from near the summit of Navajo mountain. It was found in half shade and is noted as abundant.

AQUILEGIA NAVAJONIS. n. sp. Stems 3-4.5 dm. high, viscid-pubescent throughout, basal leaves quadrirnernate, long petioled; petioles and petiolules slender, viscid-pubescent leaflets small, narrow, cuneate at the base, 1-2.5 cm. long, lobes acute or obtuse, viscid above, viscid-villous beneath: flowers about 4 cm. long, acute, spreading horizontally or slightly reflexed; laminae white (fading yellowish), 8 mm. long, broadly rounded at the apex; spurs white, slender, about 2.5 cm long, straight or slightly incurved, knob of the

nectary small; styles 10-12 mm. long, widely spreading in fruit; follicles viscid-puberulent, 10-14 mm. long.

Only one specimen has been seen. That is Mr. Clute's no. 52, collected on wet rocks, 5000 feet altitude, Navajo Creek, Arizona, July 9th-August 24th, 1919. According to Mr. Clute's notes this is a rare plant with white and pink flowers and vivid foliage. It commonly grows in the crevices of shaded rocks and was also found at Betatakin and on the road to Farmington.

The most outstanding features of this plant are the quadriternate leaves and the very viscid foliage. In the herbarium the sand is still clinging to the entire plant surface. The deeply divided leaves are reminiscent of *A. Eastwoodiae* Rydb. which is also remarkably viscid. From the latter the new species is easily distinguished by the pink sepals, the normal and regular spurs and by the more deeply divided leaves. It seems probable that *A. navajonis* is in reality most closely related to *A. triternata* Payson. That species has triternate leaves and the plant surface is scarcely viscid.



A DISAPPEARING SPECIES

BY DR. F. D. SNYDER, F. R. G. S.

THE rare orchids *Cypripedium pubescens* and *C. spectabilis* have become practically extinct in northern Ohio. The last pink lady's-slipper that I saw in this (Ashtabula) county was found by Mr. Louth, a local botanist, about ten years ago. The yellow Lady's-slipper is represented by at least one specimen here at any rate.

About three years ago Professor Craig of our local schools found a beautiful specimen in the woods in this county. He was fortunate enough to rescue it from its native element, which without a doubt would soon have been encroached upon by the agriculturists. This specimen he brought to the city

and set it out at his residence where it has thrived beautifully. It has bloomed every year, and this year it had seven lovely blossoms, and the year before when this picture was taken it had five.

Notwithstanding the fact, that this specimen has been transplanted three times, it seems to be perfect in every way. Here is hoping it will continue to thrive.

PLANT NAMES AND THEIR MEANINGS-X

LEGUMINOSAE-II

By WILLARD N. CLUTE

ALTHOUGH there are a number of herbaceous species of Leguminosae the group, as a whole, is a woody one. In the tropics, especially, shrubs and trees belonging to this family are varied and abundant. Among well-known forms are the tamarind, the logwood, the indigo plant, the red-bead tree, and the carob or St. John's bread. In our own region, a tree with all the characteristics of tropical forms is the common locust or false acacia (*Robinia pseudacacia*). In late May when other trees are well in leaf, it hangs out a profusion of fragrant white flowers in pendant racemes. So noticeable a tree naturally has a number of vernacular names. The pure white flowers and brownish-yellow heart-wood are responsible for such terms as "white locust", "yellow locust," "black locust," and "green locust". Some of these names are not so much given for some characteristic of the tree as to distinguish it from other various forms that also bear the name of locust. "Silver chain," sometimes heard is clearly patterned after "golden chain", a name given to laburnum

(*Cytissus*) whose golden flower-clusters much resemble those of the locust in size and shape. The term "false acacia" which is embodied in the specific name alludes to the resemblance of this species to the true acacias. "White honey-flower" and "pea flower" are of obvious derivation. "Post locust" is due to the fact that the wood is very durable when exposed to the weather which makes it much sought after for posts and pillars. The word "locust" so commonly used for the species of *Robinia* is said to be derived from the insects of the same name which seems hardly credible though there is no accounting for the taste in common names. The locusts that formed the food of John the Baptist were not insects, it is inferred, but the fruit of the carob tree (*Ceratonia siliqua*), and the husks which served as food for the prodigal son just previous to the banquet in which the fatted calf played a prominent part must have been from the same species.

Two other species of *Robinia* are known as "clammy locust" (*R. viscosa*) and "bristly locust" (*R. hispida*). Both vernacular names are free translations of the scientific ones and refer to twig characteristics. On account of their rosy flowers both are also known as "rose acacia". Sometimes they are called "honey locust" but this name more properly belongs to the species of *Gleditsia*. *R. viscosa* is known occasionally as "red locust" and the bristly young twigs of *R. hispida* have gained for it the name of "moss locust." The plant regarded as the true "honey locust" is *Gleditsia triacanthos*. It derives its name, not from any characteristic of the flower, but from the circumstance that the broad, flat, many-seeded pod has a strip of sweetish pulp down one edge of it which may be eaten if one is hungry enough. Other names suggesting the same derivation are "honey shucks"

"sweet bean" and "sweet locust." The term "three-thorned acacia" is sufficiently intelligible especially to those who are familiar with its strong branching thorns. This name ought by right to stand as the accepted vernacular name since it is embodied in the scientific term, but "honey locust" usually has the preference. "Thorn locust" is still another variation of the name. The hard brown seeds are known as "squeak beans" to mischievous school children who are well aware that one of the shining seeds properly twisted under foot will produce a delightful variety of mysterious squeaks guaranteed to try the patience of any teacher.

Another tree whose seeds have acquired for it a number of vernacular names is *Gymnocladus Candensis*. It is commonly known as the "Kentucky coffee-tree" and occasionally as "coffee-nut", "coffee-tree" and "American coffee-bean." It is difficult to understand the reason for such names for the seeds are much too hard to have served for coffee and in addition possess a glucoside that is reputed to be poisonous. The name "chicot" applied to this species is the French for stub or stump but its connection with the tree is not evident though "stump tree" is one of its, common names. The reference may be to the stubby branches but this is merely conjecture. "Nicker-tree" and "nicker-nut" are terms supposed to have been applied to this species in allusion to the round seeds, like a "nicker" or marble. The plant regarded as the true "nicker-nut" is a tropical species of legume. The hard dark-colored wood of our species is sometimes known as "Kentucky mahogany".

Various species of the Leguminosae have the remarkable peculiarity of folding up their leaves as night approaches and appearing to sleep—though no plant really sleeps—and several others are able to change the position of their leaflets with

great promptness when stimulated. These latter are called "sensitive plants". The classic "sensitive plant" is a tropical species, *Mimosa pudica* very common in the warmer parts of the world and often grown in old gardens and conservatories in northern latitudes. As soon as the leaves are touched they close, the leaflets folding togeather and the leaf itself drooping. In our own region other less active sensitive plants are found. A well known member of this group is the "sensitive rose", "sensitive brier" and "shamevine" whose scientific title is *Schranksia uncinata*. *Cassia mictitans* is also called "sensitive plant" and "sensitive pea" but it only tardily responds to a stimulus. Its near relative, *Cassia chamaecrista*, is still less sensitive though it folds its leaves at night and is occasionally known as "sensitive plant". The best known name of this latter plant is "partridge pea" though it is not likely that partridges feed upon it. It is distantly related to the medicinal senna and in consequence is sometimes called "prairie senna." Being the smallest of its genus in our region it is occasionally known as "dwarf senna." The species in our flora most commonly called "wild senna" is *Cassia Marilandica*. This species has some of the properties that make medicinal senna valuable and is sometimes substituted for it. *Cassia tora* of the Southern States is known as "sickle-pod" and "coffee-weed," these names referring to the shape of the pods and the hard dark seeds. *Cassia occidentalis* is called "coffee-weed", "negro-weed" and "magdad-coffee". We are unable to explain the last mentioned term or the name "magoty-boy bean" applied to *Cassia chamaecrista*. The word *magot* seems to be French and means an ape. Possibly the names here given may be some fanciful reference to the animal in the same way that the seeds are known as "negro coffee."

Our commonest species of *Baptisia*—*B. tinctoria*—so commonly grows with the partridge pea that the mention of one suggests the other. It is usually called “wild indigo” from the fact that an inferior dye can be made from it. “False indigo” and “yellow indigo” are other names for it, the yellow in the last name referring to the flowers and not to the dye. “Horse-fly weed” “horse-flea weed” and “shoofly” alludes to the belief that sprays of this plant fastened to the harness will protect the horses from flies. “Rattle-bush” refers to the ripe pods in which the seeds rattle, but the term is better deserved by allied species. The name of “clover broom” is in recognition of its resemblance to the true broom (*Cytisus scoparius*). Because of its blue flowers, *Baptisia australis* is called “blue indigo” and “blue false indigo”. It is also known as “wild indigo.” *Baptisia alba* is the prairie indigo.”

Another genus named for the dye it contains is *Genista*. The best known species is *G. tinctoria*, the specific name referring to its use in dyeing. The common names of “dye weed”, “green wood,” “green weed,” “dyer’s broom” and “dyer’s greenwood” are self explanatory. The names of “woad-wax”, “wood-wax,” and “wood wash” are variations of “woad-waxen” a very ancient name by which the Anglo-Saxons knew still another dye-plant—*Isatis tinctoria* one of the cresses. “Whin” sometimes applied to our plant is an old term for weeds in general and was given to various plants as we might apply the term brush at the present time. It may be remembered in this connection that *Genista* is from a word meaning simply bush. The plant was sometimes called “base broom” to distinguish it from *Cytisus scoparius*. The last mentioned plant is also known as “Scotch broom,” “green broom” and “besom.” The latter name is the old term for a

broom made of twigs. Possibly the word "broom," itself, may have been derived from the use of the twigs of this plant in besoms. Neither *Genista* nor *Scoparius* are native genera. They have been introduced into America from Europe and have brought their common names with them. A third species of this category is the "furze" (*Ulex Europeus*) which is known as "prickly broom", "thorn broom", "whin" and "gorse". The last term means harsh or bristly and is well applied to this prickly species. The word "furze" is a very early name for this plant.

The species of legumes that have been named "wild pea" would be difficult to count. The very characteristic shape of the blossoms has made the name appropriate in many instances. Among the number is *Crotalaria sagittalis*, though the inflated pods of this species in which the seeds rattle at the slightest jar make the name of "rattle-box" or "rattle-weed" more appropriate. The plant is also known as "loco-weed" but this term more properly belongs to species of *Astragalus* especially *A. mollissimus* and others of the Western States which produce a curious condition known as "loco" in the stock that eat it. "Crazy-weed" is another name for this species given for the same reason. *Astragalus crassicarpum* and *A. Mexicanum* and known as "ground plums" or "earth plums" from the fact that the unripe fruits resemble plums and are edible. The fruits are said to be especially relished by prairie dogs. *Astragalus crassicarpum* is also known as "buffalo pea", "buffalo bean", and "buffalo apple" because it grows in the region over which the buffalo once used to roam. *Astragalus Canadensis* like *A. mollissimus* is also known as "rattle-weed." All the species are known as "milk vetches" though none are known to have a milky juice. *Oxytropis lamberti* should be included here since it has a

sinister reputation as a loco-weed. This species is occasionally known as "stemless loco-weed," "crazy weed" and "Colorado loco-vetch."

The clovers form a wide-spread and well known group and have naturally acquired many common names mostly of obvious meaning. The word "clover", itself, is a corruption of *clava* a club. In support of this it may be noted that the "club" of our playing cards is represented by a conventionalized clover leaf. Clover is supposed to derive its name from the great three-headed club of Hercules. The French word for clover is *trefle* and the Latin is trefoil both carrying a reference to the three leaflets. Probably the best known of the clovers is the common white species (*Trifolium repens*). It is often reputed to be the true "shamrock" but the identity of the plant used by St. Patrick has never been settled. If the plant was a clover at all, the honor seems more likely to belong to *Trifolium dubium* or *T. minimum*. Many people are of the opinion that the wood sorrel (*Oxalis*) is the shamrock. Other names for *T. repens* are "white trefoil" which is self explanatory and "Dutch Clover" from its reputed place of origin. "Honeysuckle clover" refers to the honey or nectar in its flowers and not to the plant by that name. The term "purplewort" means nothing at all when applied to this plant. If used at all it should be given to the red clover (*T. pratense*). A careless bibliographer may have confused the two species. English names for *T. repens* are "sheep's gowan", "honey stalks" and "lamb's sucklings."

The soft furry covering of *Trifolium arvense* seems to have caught the fancy of nature-lovers to judge of such names as "rabbit's-foot clover", "hare's-foot clover", "pussy clover", "pussies," "pussy-cats," and "dogs and cats." "Calf clover" may have the same origin. "Old field clover", "stone clover"

and "poverty grass" allude to the habit this plant has of growing in sterile soil. "Bottle grass", however, is a puzzle. *Trifolium pratense* is the "red clover", also from the shape of its leaves "broad leaved clover", and from its abundant nectar, "honeysuckle clover", "suckles" and "sugar plums". "Marl grass" probably refers to the fact that this plant refuses to grow in soils deficient in lime, and "cow grass" indicates its use as pastureage. Incidentally one notes that in the minds of the uneducated, any plant is grass. *Trifolium medium*, a species greatly resembling the red clover, is known as "zig-zag clover" probably from its flexuous stems. In cultivation it is called "mammoth clover". Being so much like the red clover, it naturally shares its common names. In addition it is sometimes called "pea-vine clover." Another red clover, not to be confused with either of the foregoing, is the "crimson clover" (*T. incarnatum*). The name of "Italian clover" given to the latter plant refers to its place of origin while "carnation clover" is manifestly an attempt by some obtuse individual, to pronounce the specific name, just as "Napoleons" is a similar attempt at the generic name.

Trifolium hybridum is the "Alsike clover" or "Swedish clover", so named because it was common in the parish of Alsike near Upsala, Sweden. "Alsatian clover" is another rendition of Alsike and does not refer to Alsace. The plant has somewhat the appearance of a hybrid between the red and white clovers which fact is reflected in the specific name and in the common name of "hybrid clover." The "Buffalo clover" is a native of the western plains and its vernacular name is almost a foregone conclusion. Our common species of "yellow hop clover" (*Trifolium agrarium*) is also known as "hop trefoil," "yellow clover" and "hop clover." After the blooming season the flower-head dries into an object much re-

sembling the hop which fact explains the common names. A smaller species, less often seen is known as the "dwarf hop clover" or "low hop clover" (*T. procumbens*.)

The average individual makes no distinction between the true clovers and the sweet clovers, though the scientist finds points of difference, and the maker of vernacular names verifies his observations. Owing to the clover-like leaves, most of the common names indicate a relation or resemblance to the species of *Trifolium*. The "white sweet clover" (*Melilotus alba*) is called "honey clover" and "tree clover" the latter on account of its size. The "sweet" in the names of plants in this genus does not refer to the nectar, though this is abundant enough to place the plants among the best honey-producers, but to the strong, vanilla-like fragrance given off by the plants when drying. This fragrance is due to a substance very similar to the real vanilla. "Melilot" and "white melilot" are derived from the generic name and "honey lotus" is a direct translation of it. "Cabul clover" and "Bokhara clover" evidently refer to the original home of the plant. The specific name of the "yellow sweet clover" (*M. officinalis*) indicates that it was once carried in stock by the apothecary. This probably explains its name of "heartwort," since it was valued for a variety of ills. "Hart's clover" shows how easily a similarity of sounds may lead to the origin of a meaningless common name. The species was originally called *corona regia* and from its regal reputation "king's clover" and "king's crown" have been derived. The name of "plaster clover," it is surmised, indicates a medical use. "Balsam flowers" is probably from the same circumstance.



NOTE *and* COMMENT



EASTER LILIES FROM SEEDS.—Those who grow lilies usually depend upon the importers of bulbs for their specimens, but it appears that some sorts may be easily grown from seeds in this country. In China and Japan, where lily bulbs are used for food instead of for ornamental planting, it is quite likely that they may be grown in this way. Experiments in raising the bulbs of lilles from seeds have been carried on by the United States Department of Agriculture for the past six years and it is now stated that flowering bulbs may be easily produced in America by this method. The seed is sown late in autumn for spring germination. It is not stated how long it requires to produce bulbs of flowering size, nor what species is meant by Easter lily though it is probable that *Lilium candidum* is meant. The Department *Weekly News-Letter* from which this information is abstracted, fails to be explicit on this point. Such vagueness characterizes much of the information about plants sent out from Washington and gives point to the old jibe about "Washington Science."

AKELA-BERRY.—The akela-berry (*Rubus Macraei*) is an unfamiliar name among tropical fruits but it has long been known to botanists, having been discovered by the United States Exploring Expedition to the Pacific and named by Asa Gray. The plant grows wild in the elevated parts of the Hawaiian islands, the vines sometimes reaching a length of

twenty feet and a diameter of two inches. The most astonishing feature of the plant are the gigantic berries which attain a diameter of two inches. Some of the berries are large enough to cover a silver dollar. Unlike certain gigantic blackberries from other parts of the world the fruits of this species are said to be very juicy and of good flavor. It is likely that it will be introduced into cultivation in the cool, moist regions along our Pacific Coast.

COLD AND DORMANCY.—From experiments recently carried on by Government botanists, we may discover why it is that hardy plants brought into the house in autumn will not renew their growth, while the same plants left in the ground until they have been exposed to freezing temperatures for a time, will resume growth at once. It is the custom of those who grow rhubarb for the early market, for instance, to dig up the plants and allow them to freeze before starting them to grow. In some of the experiments referred to, other plants when kept from the cold remained dormant for an entire year. Other experiments showed that the effects of cold are felt only in the parts exposed to it. Plants were grown in such a way that part of the plant was exposed to the cold and part kept warm and when the whole plant was then exposed to warmth, only the part exposed to the cold grew. The theory upon which this peculiar behavior is accounted for is that growth does not begin until some of the starch stored in the cells has been turned to sugar. The enzyme that converts the starch to sugar is supposed to exist outside the plant cells and to be unable to penetrate into them until the cell wall has been weakened in some way, as by freezing. Support is lent to this theory by the fact that various injuries to the plant, such as rubbing the bark, girdling, pruning or notching the stem, produce results similar to those produced by the cold. When

the starch is turned to sugar, it increases the osmotic pressure in the cell and in this manner is believed to stimulate the cells into new growth. It is probable that different plants require different lengths of exposure to the cold in order to resume growth. Not only may the effects of chilling be noticed in the mature plant, but it appears in seeds as well. The practice of planting various seeds in autumn may, after all, be for the purpose of exposing them to the cold instead of breaking the shells as commonly assumed.

OFFENSIVE LUXURIANCE.—In the English *Garden* Miss Gertrude Jekyll complains of a number of beautiful plants which, admitted to cultivated ground, thrive so well that they encroach upon better specimens until their room is better than their presence. Since they thrive so well in a variety of soils, they are naturally hard to eradicate. Among such noxious species she lists the common horsetail (*Equisetum arvense*), the great yellow loosestrife (*Lysimachia vulgaris*), the common tansy (*Tanacetum vulgare*), the field scabious (*Knautia arvensis*), the wood sorrel (*Oxalis violacea*), the field bellwort (*Campanula rapunculoides*) the goutweed (*Aegopodium podagraria*), and the enchanter's nightshade (*Circaeae lutitiana*). To this list the editor of the *Gardener's Chronicle* adds the obedient plant (*Physostegia Virginica*), and the purple loosestrife (*Lythrum roseum*). It is likely that the plants mentioned would not prove equally weedy in all gardens, however. The soil often has a considerable influence on the luxuriance of a given species. The writer of this paragraph has found the tawny day lily (*Hemerocallis fulva*) too pushing for respectable garden company but considers the day flower (*Commelina communis*) a far greater pest. Costmary (*Chrysanthemum balsamitae*) perhaps better known as sweet Mary or rosemary, is another quickly spreading plant, but the worst of

the whole category is one of the evening primroses, *Oenothera Fraseri*. The worst pest one can get into his lawn is the common moneywort (*Lysimachia numularia*.)

Poisonous Milkweeds.—We have already called attention in these pages to the fact that a western species of milkweed, *Asclepias galloides*, is poisonous to stock. Further investigations by the United States Department of Agriculture indicate that several other species or forms closely related to the whorled milkweed (*Asclepias verticillata*) of the Eastern States are also poisonous. These forms are wide-spread in the West. *Asclepias galloides*, however, is the most venomous of the lot, being recorded as ten times more poisonous than *A. verticillata* var. *Geyeri* of the Great Plains region. In the latter region is also found *A. pumila* and on the Pacific Coast from California to Washington occurs *A. Mexicana*. *A. galloides* is found in Arizona, New Mexico and contiguous territory. Fortunately the plants are not readily eaten by cattle and sheep and few cases of poisoning ordinarily occur, but when stock have difficulty in finding other food they may eat the plant with fatal results. It may be noted that the common milkweed (*Asclepias syriaca*) is regularly used as a pot-herb in Eastern America and appears to have no poisonous properties. The swamp milkweed (*Asclepias incarnata*), however, is looked on with suspicion and practically never gathered.

Acid Soils.—It is an obvious fact that plants do not grow just anywhere. Each species is closely related to its environment. One grows only in sandy places, another on limestone rocks, others in clay and still others in muck or peat. In general, plants do not thrive in the last mentioned soil because of its acidity and the plants that are able to live in such places form a very interesting group. Among them are the

insectivorous sundews, pitcher plants and butterworts, the cranberry and other heaths, various orchids, the cotton grass and the peat mosses (*Sphagnum*.) Naturally such plants are difficult to manage in cultivation. They appear to miss their acid soil and are especially intolerant of limestone. People in limestone regions have usually had to deny themselves the pleasure of growing such species and have thereby missed a number of fine flowers, such as rhododendrons, kalmias, and azalias. The trailing arbutus and blueberry are other heaths that have thus far resisted practically all efforts to cultivate them in ordinary garden soil. The trailing arbutus, especially, has the reputation of being impossible to grow away from its native haunts. Some years ago, however, it was discovered that this plant would grow in soils containing considerable amounts of oak leaves and now Henry Bird has discovered that in regard to the pitcher-plants, at least, a small amount of tannic acid added to the soil, will reconcile the plants to domestication. The acid is supplied by an extract of hemlock bark in the proportion of one part of the acid to from fifty to a hundred parts of water. It is at present unknown whether other plants may be induced to grow by like treatment, but from the fact that oak leaves aid the arbutus to thrive, it appears likely that tannic acid, or perhaps other organic acids, may be all that is needed to promote the growth of acid soil plants under garden conditions. The subject is one that offers most interesting opportunities for investigation by those who have access to a small greenhouse. By setting up a series of potted plants as nearly alike as possible, and watering them with dilute solutions of different acids, it would soon be apparent whether a single acid can produce the effect, or whether several acids have the power. To discover just what acid will

most readily induce acid soil plants to grow in our gardens would be a most important accomplishment.

WESTERN PLANT NAMES.—Concerning certain plant names mentioned in this magazine, Prof. J. C. Nelson writes: The word "Thorn-apple" seems very elusive. I never heard it applied to either *Crataegus* or *Datura*; when we used it in Kentucky, it meant *Solanum carolinense*, a very bad perennial weed of sandy fields, and interesting because it was attacked by the Colorado potato-beetle almost as eagerly as was the cultivated *S. tuberosum*. I wonder if this application of the name was only local? The books call this plant "horse-nettle;" but I never heard this applied to it.

Will you tell me by what name the "giant rag-weed (*Ambrosia trifida*) is referred to in different localities? In Kentucky we used to call it "horse-weed", because it was greedily eaten by these animals. The last time I was in northern Minnesota, I found that the Scandinavian settlers had begun to call it "king-head", from a fancied resemblance of the akene with its sharp points to a crown; and this name has now got into some of the weed-manuals. How far south does it extend? Is there any common name for *Iva xanthiiifolia*? You know how abundant it is in the Northwest, and what gigantic size it attains; and yet I can never remember hearing any popular name applied to it. Around deserted homesteads it almost reaches the size of a tree. I had always supposed that *Ginkgo* took the name of "maiden-hair fern tree" from the shape of the leaves, which very closely resemble the pinnules of *Adiantum*. Of course, the root may have something to do with it; but I believe the leaf first suggested the name. [The point about the maiden hair fern tree is simply this: the fern was named from its roots because they were assumed to resemble hair and therefore according to the

doctrine of signatures, good for the hair. Thus arose "maiden-hair fern" applied to species of *Adiantum*, and maidenhair spleenwort applied to *Asplenium trichomanes*. The resemblance of the leaves of *Ginkgo* to the pinnules of *Adiantum* made it maiden-hair fern tree originally though it is probably maiden hair tree now.—Ed.]

COLOR COMBINATIONS.—A color combination that I saw near Westbury was worthy of note. A fine patch of mealy star-grass (*Aletris farinosa*) with their slender wands of frosty bells towered above patches of some violet-colored flower which I was unable to tell at a distance. I got out of the flivver to investigate and found it was a dwarf aster which answered the description of *A. linearifolius*. Only once before had I seen it. In an open wood near Manchester, Conn., it thrives beautifully but I did not expect to meet it in company with *Aletris farinosa* on Long Island. Another combination that appealed to me in the South Mountain Reservation, of Orange N. J. was the dogwood and pinkster-flower blooming together. The shower of snow-white bracts blended beautifully with the deep pink of the buds and partly opened bells on the bare straggling branches of this dainty azalea. Surely a floral picture of the highest order. When the heather and the broom are blooming on the Grampian mountains in Scotland there is displayed a natural combination of purple and yellow, that is hard to beat. Perhaps the New England aster and the goldenrod come nearest to it.—R. M. Crocket, Cranford, N. J. [Residents of the Middle West would venture the assertion that when the redbud and wild plum are blooming, or when the wild crab thickets hang out their myriads of pink and white blossoms, the Atlantic Coast would have to look to its laurels in more senses than one, if it would avoid being excell-ed.—Ed.]

CHANGEABLE CACTUS.—From the desert region of western Arizona Mr. James H. Ferris sends us a specimen of cactus whose color-transformations are a strong source of interest. The plant is a globular species thickly set with stout grayish thorns that must render it very inconspicuous in its desert home. The instant that rain touches it, however, it becomes a ball of flaming crimson and one of the most conspicuous and handsome plants in existence. Investigation shows that the thorns are really a deep red but so heavily covered on both surfaces with a forest of waxy columns that the color is masked. When water falls on the thorns, however, the wax becomes nearly transparent and the deep red, shining through produces the change noted.

HIGH GROWTH TEMPERATURES.—A number of simple plants are known that are able to exist in hot springs whose waters are nearly at the boiling point, but more complex forms of vegetation are quickly killed at such temperatures; in fact a temperature of 122° Fahrenheit (50° C.) is regarded as fatal. Some forms of cacti, however, seem not only resistant to dessication but to heat as well. In a recent number of *Science*, a report from the Desert Botanical Laboratory in Arizona notes that joints of a hardy *Opuntia* or "prickly pear" were observed to continue growth in a temperature of 136° F. Other plants subjected to a temperature of 144° F. resumed growth when the temperature was again lowered. This is the limit for active protoplasm, so far as known, and it apparently is not likely to be much exceeded.

NAVAJO EVENING PRIMROSE.—Those who are interested in the evening primroses may be glad to know that they can secure seeds of the Navajo species from this office for ten cents a packet. We shall be glad to exchange for seeds or plants of other primroses from the Great Plains region.



EDITORIAL



This magazine is unlike all other botanical publications in the United States in that it is not issued and financed by a society or association of some kind. It has, to be sure, a considerable list of "patrons" who have consistently supported it for many years and also a number of "associate editors" though some of these may not be aware of the title—who send us notes, suggestions and friendly criticisms as occasion warrants, but of clubs to shape its policy, there are none. As an independent publication, therefore, it has nobody to please but its readers and the editor's sole aim is to make a publication worthy of their support. At the beginning of a new volume and enlarged magazine, it may not be amiss to direct attention again to this fact and to invite everybody to join in making it a publication to their liking. We want especially those short notes which everybody makes mentally and so few transcribe to paper

* * *

It is possible that the editor of this magazine and a small party of the scientifically inclined will make another expedition to the Grand Canyon, the Painted Desert, Navajo Mountain and the Rainbow Bridge next summer. If there are any members of the *American Botanist* circle who would be inclined to make such a trip we would like to hear from them. There are no regular means of transportation to most of the points mentioned but by making up a small party the cost of the trip is not excessive.

It is some time since the World War was won and wages in many industries have returned to something approximating normal, but the printing trades still adhere to war prices. The only material that has lowered in price is paper. The printers have not only shortened their hours, but in many localities have increased their wages while illustrations of all kinds were never higher. The increased cost of printing which such conditions necessitate is having a most harmful effect upon scientific publications. A large number of the periodicals are late, or not issued at all, while book after book that in normal times would be re-issued is now allowed to go out of print since it is no longer profitable to carry it. There are now only two fern books obtainable and a large number of popular books on plants, birds, insects, etc., have disappeared from the market. The ~~avidious~~ publisher, not to be outdone by the printers, has doubled and even trebled the price of books issued at low cost before the war and because the market for nature books is limited, is not issuing others. We cannot recall a single important botanical work issued in America in 1922. All this spells stagnation for science and hard times for the printers, who in spite of high wages are not noticeably prosperous.

BOOKS AND WRITERS

The date palm (*Phoenix dactylifera*) the fruit of which with us is regarded as a sort of confection, is an important food plant in the warmer parts of the world. So extensively is it cultivated in Mesopotamia that V. H. W. Dawson of the Agricultural Directorate of that region has found it desirable to publish a memorial on the subject under the title of

"Date and Date Cultivation of the 'Irag.' The work is to be completed in three parts, the first two of which have already been issued. Parts 1 and 2 deal with the cultivation and yield of the date and the final part, which is in preparation, will take up the discussion of the varieties cultivated. The parts which have appeared are extensively illustrated by maps and photographs which graphically tell the story of the culture, harvesting and packing of the date. The publishers are W. Heffer & Sons, Cambridge, England. Part one in paper costs ten shillings and part two in the same binding is priced at five shillings.

In sublimity—the superlative degree of beauty—what land can equal the desert with its wide plains, its grim mountains and its expanding canopy of sky? You shall never see elsewhere as here the dome, the pinnacle, the minaret, fretted with golden fire at sunrise and sunset; you shall never see elsewhere the sunset valleys swimming in pink and lilac haze, the great mesas and plateaus fading into blue distance, the gorges and canyons banked full of purple shadow. Never again shall you see such light and air and color, never such opaline mirage, such rosy dawn, such fiery twilight. And wherever you go by land or sea, you shall not forget that which you saw not but rather felt—the desolation and the silence of the desert.—JOHN C. VAN DYKE.



DESERT TRUMPET FLOWER.—*Datura meteloides*
Courtesy Farm and Garden



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*Under a budding hedge I hid
While April rain went by,
But little drops came slipping through,
Fresh from a laughing sky:
A-many little scurrying drops
Laughing the songs they sing.
Soon found me where I sought to hide
And pelted me with spring.*
—Shaemas O'Sheel

OLD GARDEN FLOWERS—III

THE DATURAS

SPECIMENS of *Datura* are rarely seen in the more pretentious gardens of the present day but in old-fashioned communities somewhat remote from urban influences, the "angel's trumpets" as they are commonly called are not unfamiliar sights. There are several reasons for the neglect of this most beautiful and highly decorative group of plants. The most significant is probably the fact that included in the group is the despised jimson weed (*Datura stramonium*) of waste grounds and rubbish heaps and its unsavory cousin the purple thorn-apple (*D. tatula*) also a friendless outcast. It is difficult for the grower to realize that he is not cultivating jimson weeds. Another species, *Datura metel*, may be occasionally cultivated—it finds favor at times in Southern Europe for its fragrant though small flowers—but it barely crosses the line that separates the weeds from the flowers in the gardener's lexicon.

The ample leaves of soft green give to the cultivated species an attractive look even when out of bloom, but when the plants are brightened by hundreds of immense flowers like morning-glories, they present a sight that is long to be remembered. The flowers are often a foot in length and white tinged with violet in color. In most of the species the flowers are borne erect, but in others they hang down, probably from their sheer weight. For the most part the Daturas have the habit of blooming at the approach of evening but the blossoms seldom close with the promptness that characterizes other night blooming species which makes them ornamental for a part of each day.

Undoubtedly the best species for out-door cultivation in the United States is the desert trumpet flower (*D. meteloides*) of Mexico and the Southwest, shown in our frontispiece. It grows quickly from seed, begins to bloom early in July, and when once in flower continues to produce its great, showy, lilac-tinted blossoms until frost. It is commonly treated as an annual but it is really a perennial and will stand temperatures nearly to zero if protected. The species most commonly seen in cultivation is *Datura fastuosa*. It is a native of India and is usually known as *Datura cornucopia* in the catalogues. This is the plant most commonly known as angel's trumpet or horn-of-plenty. The double form in which there are often three corollas, one within another, is much admired but frequently this form is merely a mass of petals, white within and purplish without. When the trumpets are complete and distinct, the flowers may have some claim to attractiveness, but since the shape and size of the blossoms are their chief claims to beauty it is likely that single forms may prove more desirable. A yellow-flowered plant has been called *Datura*

chlorantha but it seems doubtfully distinct from *D. fastuosa*. It is likely that a number of other varieties of this species may have distinguishing names in the dealers' lists.

The *Daturas* are all plants of tropical and sub-tropical regions and for this reason many species must be cultivated under glass in the United States. In the warmer parts of the world the plants are often shrubs or small trees and some of these latter forms are frequently placed in the genus *Brugmansia*. Two of these, *Datura arborea* and *D. suaveolens*, are among the tree-like species and have great pendulous blossoms a foot or more long. *Datura suaveolens* is said to be a native of Mexico and *D. arborea* of Peru and Chili, but they are so much alike that they are distinguished with difficulty without the calyx. In *suaveolens* the calyx is tubular and five-toothed; in *arborea* it is spathe-like and not toothed. A second Mexican species, *D. cornigera*, is rather like these but never to be mistaken for them because it has a long spur produced from the calyx. The latter species is especially known for its strong fragrance. A red-flower plant, *D. sanguinea*, from Peru has smaller odorless blossoms.

There are possibly twenty-five different species in the genus *Datura*, widely scattered in the tropical regions. The group belongs to the Solanaceae or Nightshade family and like its relatives has poisonous or narcotic properties. None however, are poisonous to the touch. They are harmful only when eaten and the nauseous taste should prevent experiments in this direction. The leaves of *Datura stramonum* are often smoked to relieve asthma and this species still retains a place in the *Materia Medica*. Other species are used to produce a sort of intoxication and *D. meteloides* is used in the religious ceremonies of the Indians of our own Southwest and as

a sort of anaesthetic in their rough surgery. The ripened fruits of nearly all the species are spiny and this accounts for the name of "thorn-apple" applied to the jimson weed in Europe. One of the interesting features of the flower is that the long tubular calyx which encloses the other parts of the blossom until flowering is over is finally cut off by the plant about half an inch from where it joins the stem and falls with the corolla. In most cases the flowers last but a day but new blossoms are always ready to take their places.

All the species that will grow in the open in our latitude are very easily cultivated. They are fond of strong sunlight but have no special predilections as regards soil though a sandy loam seems to suit them as well as anything. It is the lack of fastidiousness in habitats that makes several of the species weeds, but this family characteristic makes them excellent subjects for experiment in the hands of the inexperienced gardener.

THE CLASSIC YARROW

BY VIRGINIA BALLENT

LEGEND and history enhance plants as well as places. Why then is the classic yarrow treated in California with scant respect and little admiration? It certainly saved our pioneers from various evils before doctors had arrived in the new land. We seem to have forgotten all the old stories about it. Almost we have forgotten the old fashioned name.

Withered old Spanish women still gather it but they call it "milhojas". In the far places Indian squaws use it still making great secret about its gathering, as is their manner when they go herb plucking. But each tribe has a grunted name for the plant that gives us no picture of yarrow; though once in a while one's nose may perhaps in a city handicraft

shop. Some Mahala Mary has thriflty used her woven ware against the time of its selling. The tang of yarrow is the basket's predominating smell.

Most children cast it out of their wild flower bouquets calling it a weed. It is the children who must keep alive the folk-lore of plants. Dear me have these had no grand mothers?

Getting at the character of wild plants is likely to develop in one an indifference for the merely sentimental perfumes of garden flowers. The yarrow has a bitter-sweet virile fragrance. It means something. What does it mean? Well, to one it means medicine.

To another it recalls the Siege of Troy story and the sulky Achilles who it is said first found out the potency of the plant which gave it its botanical name, *Achillea*. We do not know if he made a plaster of yarrow and applied it to his vulnerable heel, but it is written he tried it upon his soldiers' weaknesses with good success.

To others the smell of yarrow brings up tales of gypsy charms and love-lorn women of whom many a one down the ages has picked it from a grave at midnight murmuring an incantation the while. Later it was presented to the refractory lover.

Faith and the oftentimes much wilted yarrow and—Oh yes, other things beside—, usually got the lover back. For in those days the blood had not run so bitter and cold. It sometimes happened then that money was the least of all magic.

We wonder if the yarrow recalls old tales too; quaint customs of a more romantic humanity. We bend to the flat topped clusters studded with small white shallow flowers, enameled and aromatic. The yarrow has bloomed through many changes of the earth's vegetation itself remaining un-

changed. We say to the ferny leaved aboriginal yarrow "Never mind, primitive women and primitive plants will have their day again."

Some of us love the yarrow just for its fine closely set beauty. Other bright flowers arranged with it, are given added grace of color and form; that spark of tone and contrast a touch of white always draws forth in flowers, faces, land-and water-scapes.

Many bugs beetles and short tongued bees fly long distances following the strong scent of yarrow. Look at that smoke of red lady bugs wavering out of the cool shadow of willows. Like blown sparks they drop to the yarrow. The taste of the plant is offensive to birds. Bugs and beetles know this and many directly or by substitutes fill their bodies with the juice of yarrow. Some insects dote upon the acrid juice and others top off with it as a safety medicine. These red lady bugs are especially fond of the plant lice that live upon hoarhound, tansy, milkweed and yarrow.

Yarrow stops nose bleed and when pushed up a well behaved nose causes it to bleed. It cures ague but if given to one without malaria brings on chills and other ague symptoms If bound on a healthy hand or foot it will cause rawness of the skin and by the same token will heal old sores. A strong infusion of the plant will break up a cold overnight but will over come the lesser ailment with a fit of staggering and stupor. It will cause healthy bones to ache but a strong tea taken at night will in a week or less cure inflammatory rheumatism. You see the yarrow is a potent and powerful plant. Admire and respect it. Never use it trivially. It is the herb of gypsies. It is the witch's plant. It is one of the simples of good and wise old women. It is in the medicine case of some few wise old country doctors. Yes indeed you must

be most careful in calling upon the yarrow. It may lose you a lover. It may make incantations go wrong. It may bring on at least temporarily the very disease you dread. Only be sure that you have got the formula right that you use its magic correctly and the yarrow will give the benefit you crave. And for all this the herb is not very different from about a thousand other old world and new world plants. For in all vegetation there is more or less occult utility and magic.

Always consult what we may call the soul of the yarrow, in arranging it decoratively in a room, never put it with a flower that has not the remotest tendency toward affinity with the yarrow, lesst the two abash and offend each other. Never with lillies, camilias, orchids nor violets. Blossoming wands of yarrow look well with heavy hanging man-made chrysanthemums, with crimson and purple horticulturally doubled zinnias, with the airy painted cosmos, with frilled and fluted dahlias bred to gorgeous hues.

But companion the yarrow with the plumes of golden-rod and wild purple asters and the pink fringy Erigeron in a long black pottery jar such as the Havasupais Indians make and you have a poem in your room, an earth-sung poem. And this should be in a simple wilderness home, with windows opening out upon the unspoiled gardens of God.

IMPORTANT MOVEMENTS OF PLANTS

BY JOHN J. BIRCH

THE movements of plants are far more complex and numerous than those of animals. Because of the complexity and variability of movements, a general outline inclusive

of all, would be quite impossible. In fact there are some movements peculiar to certain plants and dependent on temporary or occasional factors which become modified by environment. Every animal movement is the result of a tension of muscles regardless of the stimulus; but such cannot be said of plants.

CIRCUMNUTATION

The most common and universal movement found in the plant kingdom is circumnutation. It is the elliptical or circular movement, made by apparently every growing part of all plants. The movements vary greatly in form and amplitude with different species. Some plants describe larger circles than others, while those which describe ellipses have a still greater variation.

Circumnutation is brought about by a growth, first on one side of the organ and then on the other. The cells become steadily more and more turgescent on one side until the part suddenly yields and bends. Then they become more so on the other and the part swings around again. It is probable that the more rapid the growth the greater the movement, until the plant is full grown, at which time circumnutation would be very slight. Just why every part of a plant while it is growing and in some cases after growth has ceased, should have the cells rendered more turgescent, and the walls more extensible, first on one side and then on another, thus inducing circumnutation, has not been conclusively shown. But by all appearances it would indicate that the changes in the cells require periods of rest.

The seat of circumnutation in leaves generally lies in the petiole, but sometimes in both the petiole and the blade or in the latter alone. The extent of the movement varies in different plants. It is chiefly in a vertical plane, rising from 2 to

10 degrees in the average plant. The rising and lowering lines never coincide thus giving a lateral movement as well; the two motions which when combined, generate irregular ellipses. The amount of vertical and lateral movement varies with the time of day, amount of moisture and heat, and due to these conditions the ellipses are variable.

The periodicity of plant movements is a very interesting phenomena. Generally they rise a little in the evening and early part of the night, sinking again on the following morning. The upward movement in the evening is at first slow, beginning at very different hours, and gradually increasing to a maximum. Leaves possessed of a pulvinus have more distinct nocturnal movements, known as "nyctitropic movements." The insectivorous plants are very little affected as far as their movements are concerned by light, and it is probable that they do not have any night movements.

CIRCUMNUTATION OF CLIMBERS AND RUNNERS

The simplest case of modified circumnutation is found in the movement of climbing plants, with the exception of those which climb by rootlets or motionless hooks. The climbers have a tremendous amplitude of movement, caused very likely by the greatly increased growth over a small length. The movement is more regular than of ordinary plants, but the ellipses are formed in all directions.

This power is innate in the plant, and is not excited by any external agent except touch so far as can be ascertained. It is this power which has been gained for the sake of enabling climbing plants to ascend to a greater height and thus reach more light. The tendrils in their movement, feel a support and twine spirally around it. The circumnutating stems of some plants can twine around a support only when it is thin and flexible, while some can twine around a support

only when it is more than a few inches in diameter, while in tropical forests some can embrace enormous tree trunks.

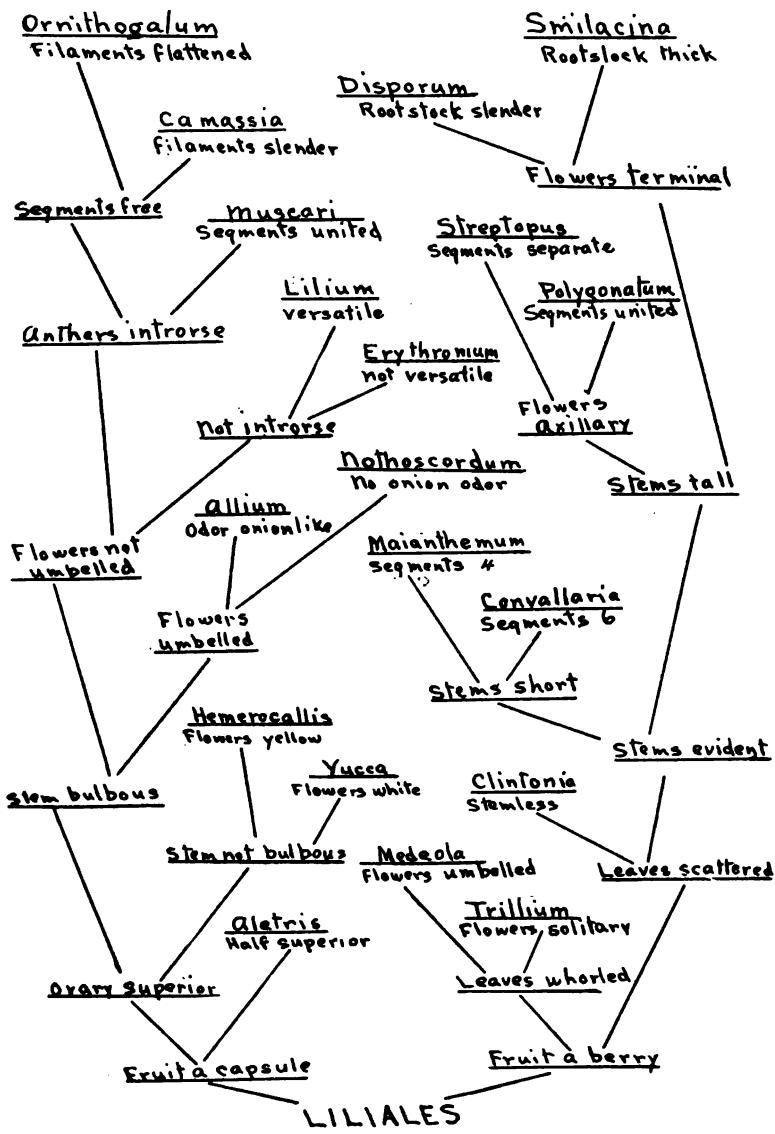
The runners of creeping plants have a very complex movement. It is obvious that this movement aids them in finding a passage between surrounding plants and other obstructions. If they did not circumnute, their tips would come in contact with obstructions and double up, thus hindering the spreading of the plant from the parent stock. Their chief motion is vertical and due to the weight of the end of the stolon, the ellipses formed have long vertical and very short horizontal axes.

(*To be continued*)

A NEW FORM OF KEY

NO matter how carefully the technical keys are constructed by the skilled botanist, the novice always has more or less difficulty with them. It is not easy to follow directions in all cases and a single slip, of course, lands him in a group that may be quite remote from the one his plant is in. The Key on the opposite page is not open to this objection for all the searcher has to do is to follow up the lines from Liliales on the bottom line until he reaches the genus he is in search of, being careful to take the correct line at each fork of the road.

The Key is not designed to show relationships though it naturally throws similar plants together and therefore gives the beginner a somewhat comprehensive survey of the group to which his plant belongs. The genera keyed out here are those in the two most important families of the Liliales. If it proves serviceable to students, keys of the other groups may be printed in later issues.



BOTANY FOR BEGINNERS II.

By WILLARD N. CLUTE

IN the popular mind the pursuit of botany is so indissolubly connected with the study of flowers that these structures are often assumed to be the only parts of the plants of any real significance. The beginner is always astonished when he discovers that many of the formal courses in school and college do not mention the flowers at all. He may even wonder what there is left to study if the blossoms are eliminated; certainly these are the parts that make any plant worth while to him. Indeed, the word flower in his vocabulary is often extended to include the whole plant, and he speaks of cultivating his flowers when there may be no blossoms in sight.

It is a comparatively new idea that the production of flowers for ornament is not the end and aim of the plants existence. In the long ago, it was universally believed that flowers existed solely for the delectation of mankind. It never occurred to those early observers to wonder why the lines and spots that so often ornament the interior of tubular blossoms were not on the outside if they were designed to be seen and admired by human beings. Nearly everybody, nowadays is aware that flowers have been evolved without any thought of pleasing that species which rather boastfully styles itself the Lord of Creation. That their beauty and fragrance happen to please man is merely so much his good fortune.

The bees and butterflies discovered what those lines and

spots were for, millions of years before mankind even began to look at them. It was not, in fact, until the middle of the 17th century that the German Botanist, Sprengel, pondering over the visits of the insects to the flowers in his garden, solved the mystery of the blossoms and discovered their connection with the production of seeds.

Since Sprengel's day we have found out much that he did not know about the flowers and have discovered numerous others that the ancients probably did not regard as flowers at all. Even now we may find individuals who reserve the title for the bright-colored forms and speak of all others as weeds. Such people are commonly of the opinion that our forest trees do not bloom. They can usually recall seeing certain caterpillar-like structures on the trees in the spring, but they regard these as mere excrescences to be thrown off with the bud-scales and loose bark as a natural accompaniment of the resumption of growth. When the pollen is showered down from the millions of pine blossoms the average individual never surmises its origin but is convinced that some distant volcano has suddenly become active and thrown out a cloud of sulphur.

It is, of course, quite natural that the novice should be primarily interested in the flowers. They are by long odds the most attractive of the plant parts and make a nearly universal appeal. Those who take up the study of plants out of school nearly always begin with the blossoms. In a few cases the beginner may have his curiosity aroused by a fern, a moss, a lichen or a bit of seaweed and develop a predilection for investigating such things, but if left to himself, he usually begins with the largest and brightest blossoms. Those who have become specially interested in the plants can usually recall the very species and the incidents which sent them off on

their botanical hobbies. It is said that the botanist, Asa Gray, was impelled to desert medicine for botany by the examination of the common little spring beauty. Another botanist of note once told me that the multitudes of hepaticas in our spring woods induced him to take up the study. The biographies of botanists contain many such instances. The inclination toward flower-gathering is possibly the survival of a very ancient practice. Savage man, it is well known, wore flowers long before he wore clothes; in fact, in the remoter parts of our planet, the inhabitants are still in the flower-wearing stage and even in civilized regions, though clothes may appear to be of more importance, we continue to include flowers as a sort of decoration.

It is difficult to imagine a more harmless and pleasant pastime than flower-gathering. Bird study probably comes next to it, but birds have to be carefully stalked through forest and glade while the plants do not require even this exertion. Rooted in the soil they await the coming of the collector, but not to make the conquest too easy, they have their times and seasons for appearing at their best and must be found when they are displaying their blossoms to make the occasion complete. Like other coming events, however, the blooming period casts its shadow before and one may anticipate the climax in swelling buds and lengthening flower-stalks. It is one of the satisfactions of plant study that the various species have a fair degree of permanency in the locality. It is as if they held part of the landscape by right of ownership. If they are to be found at all, they will be right where they were last year and others are quite likely to be found in similar localities elsewhere. The collector rarely returns from his expeditions empty-handed. Each trip is a real voyage of discovery and the treasures secured are so many visible evidences of his

success; to be shown to friends, to be preserved in the herbarium or to be cultivated in the garden as perennial reminders of the pleasure experienced in their original discovery.

No matter what phase of plant study interests the novice, his first requirement is for the names of his specimens. When he has a species firmly anchored to a name, he has the means by which he can handle his find mentally, can discuss it with his friends or look up additional facts about it in the books. The failure to find such names readily has probably done more to discourage the beginning student than any other single thing. And since the name is of such great importance the novice too often considers attaining it the object of the quest. To be sure this is the object of all keys, scientific or otherwise, and many books seem written with the same end in view, but it is truly said that the names are but the alphabet of botany. If one becomes interested in mere names, he runs a risk of wearing out his locality in a few years and of being obliged to turn to something else for amusement, but when he becomes interested in the lore of the plant world, he finds in a single locality, material for the study of not one but many lifetimes.

The names that the beginners desires are not those used by the strict scientist. He wants the common names of plants —those homely meaningful names by which the common people know them. These are often much older than the science of botany itself, having been in existence almost from the beginning of our language. Unfortunately the names now in use have been derived from a multitude of sources and often do not carry with them the exactness of designation required by science. Gradually he comes to see the necessity for the technical terms. These latter were evolved after a multitude of changes but have now reached a fair degree of brevity and exactness. Up to the middle of the eighteenth

century, however, the best the scientist could do was to refer to his plants by a long series of Latin terms. It was the great Linnaeus, "the Father of Botany" who perfected the scheme of giving to each plant a name of two words which corresponds roughly to our christian and surnames. This scheme has been universally adopted but it still affords opportunity for some particularly astonishing combinations as in *Kraschenninikowia Maximowicziana*, the name of a small anemone of the Old World. The obsurdities to which the system may run when variations of the species engage the attention of the matter-of-fact botanist is seen in such combinations as *Prunus Pseudocerasus* Lindley, subspecies *Jamaskura* (Sieb.) Makino, variety *glabra* Makino, forma *praecox* Makino which is the full title of one of the cherries so dear to the heart of the Japanese. Happily such monstrosities are the exceptions which prove the rule. They are the "horrible examples" of the science. Ordinarily the technical names of plants are not difficult. None are harder than *rhododendron*, *chrysanthemum*, *ranunculus* and similar names in daily use by the non-botanical.

The question is often asked why plants need to be given such outlandish names at all. To this it may be replied that owing to the wide distribution of plants, the names cannot be sectional or even national in character. We must have names that any student, no matter what his situation, can use and understand. It is probable that the use of Latin or Greek for such names was not at first regarded as important. The languages mentioned happened to be those in which most books were written at the time the scientific naming of plants came into fashion and it was natural that the names selected by scholars should be from those languages. The selection, however, seems to have been most fortunate for the Latin is now a "dead" language in which the meaning or form of words

do not change as they often do in modern languages. Thus we may have stability in meaning if we cannot have it in nomenclature.

When it comes to learning the names of plants, it may be said that in botany as in other studies, there is no royal road. The ordinary road, however, has been greatly improved of late. The bad places have been bridged by various "how-to-know" books and guides have been set up that make it increasingly difficult to miss the way. In any event the present generation has many facilities for identifying plants that the early student did not possess. People in middle life can remember the time when there were no botanical books intended expressly for beginners. In those days digging out a scientific name from the technical works was a demonstration of unusual intellectual ability. Nevertheless the study of botany was particularly recommended to young ladies as not too taxing to their minds.

At present there are many ways of becoming acquainted with the plants. One of the easiest is by associating with a more learned companion and obtaining a considerable education "by absorption." Those who take up botany by themselves frequently get one of the popular handbooks that are now so common and identify their specimens by color of the flowers or the place of growth. The great trouble with such books is that they frequently omit the very species for which we are looking. We trace it to its group, we encounter relatives that look much like it, we say "it must be here somewhere"—but it isn't. After a few such disappointments the earnest student buys a real Manual and determines to master the technical keys. With such a book, he knows that his species is to be found if he has the ability to trace it.

The two Manuals most commonly used are Britton's "Flora of the Northeastern States and Canada" and Gray's "New Manual of Botany" the latter in its seventh edition. Britton's book has better keys but uses a discredited nomenclature and splits the plants into a larger number of species. Gray's Manual is probably somewhat easier for the beginner in spite of its poor keys since it does not make so much of minute differences in structure. Wood's "Class-book of Botany" was probably better than either of these for the beginner, but it is now long out of print and only to be found in the libraries of older students. Scarcely second to the Manuals as a source of information are the botanical journals which continually discuss unfamiliar plants or publish new and interesting items about well known forms. The reader therefore soon has a number of mental pictures of plants which he has never seen but which he is frequently able to identify at sight when he comes upon them later, from their remembered descriptions. Who is there that has passed the initial stages of botany who cannot recall many occurrences of this kind; indeed, who is there that is skilled in botany who does not, even now, have numerous pictures which are still to be matched with realities?

Every flora has its rarities which both botanist and botanizer are anxious to see, but naturally enough, they never agree as to which are rare. The botanist is quite likely to be attracted to some insignificant specimen whose value depends upon it being out of range, or a variety of some better known species, but the botanizer is more likely to be in search of such famous plants as the pitcher plant, walking fern, sundew, moccasin-flower, shooting-star, compass plant, ginseng, Dutchman's breeches, cardinal flower and even trailing arbutus and mountain laurel. How many times have we all made long journeys just to see a single one of these! And how many

more expeditions we expect to make to see other plants which we now regard as fully as attractive!

PREPARING SUCCULENT PLANTS FOR RAPID DRYING

By DR. N. M. GRIER.

SUCCULENT plants such as species of *Cactus*, *Sedum* and others do not readily respond to the ordinary methods of pressing and drying in preparation for herbarium specimens. One method of hastening the dessication has been to apply pressure to the specimen with a hot iron, a process which is laborious and frequently requires a disproportionate amount of time. Another is to immerse the plant in hot water, but as a result the specimens may turn dark and in moist climates are apt to become mouldy unless special precautions are taken. Finally, where the specimen will permit such, botanists remove the surface which would be invisible in the mounted specimen and scoop out the water retaining tissue, after which pressing and drying is somewhat facilitated.

All of these methods, however, have their disadvantages, and at the suggestion of Dr. O. E. Jennings, Curator of Botany, Carnegie Museum, I have endeavored to obtain more quickly and conveniently through chemical agencies, the effects upon plants of this type secured by the methods of killing previously indicated, which result of course in the loss of turgidity and death of the water retaining tissue. Specimens treated chemically in the way to be described, have not only dried and pressed more quickly, but have been pronounc-

ed by botanists to be equal if not superior to those obtained by the older methods.

The experiments upon which this newer method rests were made at the Biological Laboratory of the Brooklyn Institute of Arts and Sciences, Cold Spring Harbor, N. Y. during the summer of 1921. The following species of succulent plants were used, *Opuntia vulgaris* Mill, *Salicornia europaea* L., *Sueda maritima* L., *Sedum purpureum* Tausch, *Cakile edentula* Hook, and *Arenaria peploides* L. The starting point was the study of the effect upon these plants of the more common fixing and killing reagents known to the plant histologist, with preference given to those more cheaply obtained and more likely to be a reagent in the herbarium. To facilitate the penetration of the reagents, incisions were made at from 1-3 in. intervals along the stems or stem-like structures of what would eventually be the ventral surface of the plant when finally mounted. In *Opuntia*, however openings were made all around the edges of the separate phylloclades, and the epidermis of one side of these punctured with a needle at the point of attachment of the spines. Each specimen of plant used was then immersed in a quantity of killing fluid about five times its own volume, and weighted down if necessary with a piece of glass. Controls for the experiments were made by preparing other herbarium specimens in the ways first indicated. The results of interest to the systematic botanist from the series of experiments are now present under the headings of the reagents used.

Medium Chromo-Acetic Acid Solution. (Basic formula as designated by Chamberlin: Chromic acid, .5 gm; glacial acetic acid, .1 gm; water, 100 cc.) Well perforated specimens of the above named plants were treated with this fluid from 24-43 hours; in the case of *Opuntia*, a longer time varying

according to the size, although 72 hours was abundant for most specimens to completely assume the color of the reagent, when they may be removed and washed. Six to twelve hours of the latter usually removed most of the stain of the chromic acid, leaving a color easily as desirable as that secured by ordinary methods of preparation. The chemically treated specimens after drying and pressing were ready in most cases for mounting at least three days ahead of the controls, and showed no tendency to mould in the moist climate at the Laboratory. Specimens of the cactus acquire a leathery consistency and an olive green color. This killing fluid and the following may be used at least three times without impairing their powers for this purpose.

Formalin-Acetic Solution. (Basic formula: 100 cc. 4% formalin; 3cc. glacial acetic acid.) Under similar conditions to those governing the use of the medium chromo-acetic solution, similarly satisfying results were obtained by the use of formalin acetic solution. Penetration was more rapid, and the period of washing is safely abbreviated. The treated specimens exhibited a somewhat pale color, and with prolonged exposure to the reagent became somewhat fragile and brittle.

Denatured Alcohol. (This was 95% alcohol apparently containing formalin.) After 24-43 hours treatment with this fluid, followed by 3-4 hours washing, small specimens of all the plants with the exception of *Arenaria* were ready for pressing and drying. In the case of *Arenaria*, the brittle quality of the leaves was best overcome by the use of the other killing fluids. Specimens treated with alcohol were of a paler color than those treated with other chemicals, although there was not any great appreciable difference in the cases of *Sueda* and

Salicornia. The denatured alcohol may be used for this purpose at least three times.

Potassium hydroxide. (5% solution.) Although used principally as a macerating agent, this compound yielded excellent results with *Sueda* and *Salicornia*, the specimens remaining mostly a normal green color. A much shorter period is required for washing. With the other plants it was unsatisfactory, probably on account of slow penetration. All specimens treated with it show a tendency to mould unless quickly dried. With such a precaution, the satisfactorily treated specimens were ready for mounting two days ahead of the control.

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PLANT NAMES AND THEIR MEANINGS—XI

LEGUMINOSAE—III

By WILLARD N. CLUTE

CLOSE to the sweet clovers, comes another familiar genus *Medicago* to which belongs the "alfalfa" (*M. sativa*) and others. In the Old World, alfalfa is commonly known as "lucerne" from the belief that it was originally from Switzerland. Britton and Holland in their "Dictionary of Plant Names" however, say that the plant is not especially common about Lucerne and that Europe did not get its supply from Switzerland. Place names, it is well known, are no indication of nativity. Our "Canada thistle" is not a native of Canada. "Burgundy trefoil", "Brazilian clover" and "Spanish trefoil" are other names for the alfalfa that are no more appropriate than others mentioned. Our species, like several of

its allies was also known as "medick". "Purple medic" alludes to the color of the flowers and "snail flower" probably refers to the coiled seed-pod, though by rights *Medicago scutellata*, a species often cultivated in gardens, is entitled to this name. This plant is another of the "sain foins". The name appears to be applied to any kind of valuable forage plant though probably the original "sain foin" was *Onobrychis sativa*. This latter species was anciently called "lucerne", also, and this doubtless accounts for the curious transposition of common names. "Holy hay" applied to our plant is a monument to the stupidity of some early writer who mistook the French word signifying health for the word saint. The word alfalfa, itself, is a rendition of the Arabic *alfacfacah*, according to the dictionary.

Medicago lupulina is commonly known as "nonesuch." The reason for this is not apparent for the term nonesuch commonly means very superior. There is, however, a secondary definition of the word which indicates unequalled badness and it is possibly in the latter sense that the name is applied, for the plant is an insignificant weed of no especial value. It has, however, a multiplicity of common names. Perhaps "black medic", "black nonesuch" and black grass" may refer to its disreputable qualities though "black-seed" seems to put the emphasis elsewhere. "Hop clover", "yellow hop clover" and "hop medic" refer to the resemblance of this plant to the "low hop clover" (*Trifolium*). This species is often sold as the true shamrock, which for all we know of the matter it very well might be. "Sain foin" naturally falls to a species of *Medicago* and "horned clover" evidently refers to the seed pods. *Medicago denticulata* bears the name of "bur clover" and it would be singular if other members of the genus have not acquired it.

Not all plants are clovers that are called so. Any plant with leaves of three leaflets are likely to be regarded as belonging to the group, however, and we are prepared to hear the species of *Lotus* and *Hosackia* called "trefoil" and bird's-foot trefoil". Our only species of *Hosackia* is also known as "wild vetch" and "prairie bird's foot trefoil". *Lotus corniculata* is an introduced plant and has an abundance of vernacular names of no special interest on this side of the water. Among them are "ground honeysuckle", "bloom fell", "cat clover," "crow's toes", "cross toes", "sheep-foot", "shoes and stockings", "bird's eye" and "ladies fingers." The "prairie clovers" are found in the genus *Petalostemum*. The common name is fairly appropriate, for the species when in flower rather closely resemble clovers. In addition to the general name, *P. candidum* is known as "white tassel flower". *P. purpureum* is the "red tassel flower" the "tassel", be it known alluding to the elongated spikes of flowers. After the petals have fallen, the close-set seed-pods give the plants the name of "thimble weed".

Among the more curious of the legumes are the species of *Amorpha* whose flowers can boast of only a single petal. *A. canescens* is commonly known as "lead plant", because, according to Wood it grows near lead ore. Others say the name is not from any connection with the metal but because its densely downy leaves give it a hoary appearance which by a great stretch of imagination might be considered to be lead-colored. Other names are "lead-wort" and "wild tea". Since the plant is not used for tea it is conjectured that "wild pea" may be intended by the latter name. "Shoestrings" is a term that refers to the long and slender, but strong, roots. *Amorpha fruticosa*, a taller species, is "lead plant", "river locust" and "false indigo." The locust-like leaves and the

plant's habit of growing along river banks makes the second name appropriate while the resemblance to the true indigo plant which grows in parts of its range makes a distinction between the true and the false necessary.

Peas and vetches and well mixed in the three genera, *Tephrosia*, *Vicia* and *Lathyrus*, most of which have tendril-bearing pinnate leaves. *Cracca*, the Latin term for vetch, is often substituted for *Tephrosia* in the scientific terminology. Our commonest species of *Tephrosia* (*T. Virginica*) is an interesting plant with downy gray leaves and flowers of pink and yellow. Its commonest vernacular names are "hoary pea" and "wild sweet pea". Rabbit pea" and "turkey pea" are other names probably of fanciful origin. "Goat's rue" is another well known name for the plant, but its application is obscure for there is no resemblance to rue. The names "devil's shoestrings" and "cat-gut" refer to the strong, wiry roots. Like most sand plants, the roots of this species extend for long distances and interfere with the plow.

Lathyrus is the real sweet pea genus. The "sweet pea" of our gardens is *L. odoratus* and the perennial pea" or "everlasting pea" is *L. latifolius*. Because of its fondness for growing in sterile places near the water, *Lathyrus maritimus* is known as the "beach pea", "seaside pea" and "heath pea". *Lathyrus decaphyllus* is the "prairie vetchling" or "everlasting pea" and *L. palustris* is the "marsh vetchling" and "wild pea". An Old World species, *Lathyrus pratensis*, which has become sparingly naturalized with us has, as usual, a number of vernacular names such as "mouse pea", "cow peas", "Tom Thumb", "angleberries" and "ladies fingers".

The plants most entitled to the name of "vetch" are the species of *Vicia*, since the word vetch, itself, is only another rendering of the generic name. "Tare" applied to several

species seems to imply worthless characters and "tare vetch" or "tare fitch" are old names for weedy plants that were better exterminated. The word "tine" has something the meaning of tare and is illustrated in such terms as "tine-weed" and "tine tare", applied to *Vicia hirsuta* of Europe which is now naturalized here. Other names for this plant are "tare", "tare vetch" and "hairy vetch". "Strangle tare" is an appropriate name for a plant that climbs upon and smothers other species. The large bright flowers of *Vicia Americana* have caused it to be known as "wild sweet pea", "purple vetch" and "wild pea". Other names are "American vetch", "peavine" and "buffalo pea". *Vicia cracca* is the "Canada pea", "blue vetch", "cat peas", "bird vetch" and "cow vetch", the last three being more fanciful terms than real names associated with the animals indicated. *Vicia sepium* is the "wild tare" or "crow peas" and *V. tetrasperma* is the "lentil tare", the lentil meant, of course being the well known legume of that name. *Vicia sativa* is known as "spring vetch."

Still another group of plants sometimes called peas belong to the genus *Vigna*. The well known "cow pea" of the Southern States is *V. sinensis*. It is also known as "whip-poor-will pea", "lady pea", "black-eyed bean" and "China bean". *Phasolus polystachos* is the "wild bean" or "kidney bean". *Centrosema Virginiana* is the "spurred butterfly pea". *Amphicarpa monoica* is "hog peanut", "wild pea-vine" and "wild peanut" which names refer to the underground pods produced by the cleistogamous flowers of this plant. The name "licorice" sometimes found in books, seems to be a misnomer for our plant which but slightly resembles the true licorice (*Glycrrhiza glabra*) a plant of the Old World. Our "wild licorice" (*G. lepidota*) is called "American licorice", "licorice root", "sweet root", and "sweet wood".

The *Wisteria* of our gardens is a Chinese species (*W. Chinensis*) but the genus is found in both Hemispheres and the American species, *Wisteria frutescens*, is frequently cultivated. Being a legume it may possibly be entitled to the name of "kidney bean tree" but "virgin's bower" is surely a misnomer. Owing to the resemblance of *Apios tuberosa* to the *Wisteria*, it is often called "wild wisteria". It is however; more frequently known as "ground-nut" in allusion to the rounded tubers, in no sense roots, which form part of the monilliform rootstock. These tubers are edible and were, in fact, the first "potatoes" brought back from explorations in the New World. The Indians made regular use of them. A considerable number of other names allude to these tubers among which are "potato pea", "Indian potato", "pig potato", and "white apples". The plant is also known as "trailing pea", "ground pea", "wild bean", and "travellers delight". The last name seems like a book name, but the fragrant chocolate colored flowers perhaps deserve it.

Several species of *Psoralea* produce edible parts, but unlike *Astragalus*, the edible portions are the roots. The specific name of *Psoralea esculenta* alludes to its edible properties and among its vernacular names are "prairie apple", "prairie turnip", "prairie potato", "Indian bread-root", "Cree potato", "Missouri bread-nut" and "tipsin" or "tipsinna". The last mentioned sound suspiciously like the Indian name for the plant. "Pomme blanche" the French for white potato, and "Pomme de prairie" are self explanatory. *Psoralea hypogaea* is also known as "Indian bread-root". *Psoralea onobrychis* is known as "French grass" and "sain-foin psoralea". The Old World "sainfoin" was *Onobrychis sativa* and the common name which may be translated as safe or healthful hay or grass was undoubtedly transferred to our plant because of this

resemblance. Thomas Nuttall gave the specific name *onobrychis* to our plant from its resemblance to the European species. In all probability the name "Sampson snakeroot" applied to *Psoralea pedunculata* is derived from "sainfoin", "Bob's root" and "congo-root" applied to this species are unintelligible to the writer. *Psoralea floribunda* and *P. tenuifolia* are known as "scurvy-pea". This name has nothing to do with scurvy, however, but refers to the white-hoary covering of the young plants and should properly be written "scurfy pea!"

To all the species in the genus *Desmodium* the names of "bush trefoil", "tick trefoil", "beggar-lice" and "beggar's ticks" are applied. Anyone who has stumbled into a thicket of these plants in autumn will recognize the appropriateness of the designations. In addition *Desmodium Canadensis* is called "sain foin". *Desmodium Michauxii* is known as "dollar leaf", for what reason we know not, and "hive vine" which we suspect refers to its nectar-yielding properties. Another "hive-vine" is *Cornilla varia* a plant better known as "coronilla" or "crown vetch". These latter names refer either to the use of the flower as garlands, or more probably to the crown-like head of flowers. The plant is also called "axseed" and "axwort" for no reason that we can discover.

The striking racemes of blue and white flowers should have secured for *Lupinus perennis* a better vernacular name than that of "wild pea" and thus relieved us from calling the plant "lupine". The most descriptive but little used name is "sundial" possibly in allusion to the round pinnate leaves whose leaflets spread out in a circle like the conventional sundial though Wood says the reference is to the leaves which follow the sun all day. "Quaker bonnets" and "old maids bonnets" are probably book names imposed for the fancied resemblance of the keel of the flower to the head-

gear mentioned. The "false lupine" is *Thermopsis rhombifolia* which is also called "yellow pea", and "bush pea". Its congener, *T. mollis*, also bears the latter name. Here we may also list the "bush clover" (*Lespedeza capitata*) which, owing to its downy leaves, is also called "dusty clover".

A fine, though somewhat rare, tree native to the Ohio valley is the "virgillia" (*Cladrastis lutea*). The plant was originally called *Vergillia lutea* which accounts for the common name. The species has long pinnate leaves, white locust-like flowers and yellow wood and naturally becomes "Kentucky yellow wood", "American yellow wood", and "yellow locust". "Fustic tree" is another reference to its properties as a dye-wood, the fustic of the tropics being used for the same purpose. "Gopher wood" is unintelligible to the writer. It was the name of a unidentified wood used in the Ark by Noah but it is not likely that the supply was imported from Kentucky!

In spring when the young leaves are just unfolding, *Cercis Canadensis* covers its young twigs with an abundance of pink flowers and, notwithstanding the fact that it is in full bloom before it is noticeable, is very generally known as "red-bud". The European species seems to have escaped this name but to have fallen upon a worse one being called "Judas tree". By virtue of belonging to the genus, our plant inherits the name though it is without significance thus applied. The tradition is that the flowers of both species were originally white until Judas selected the European *Cercis siliquastrum* on which to hang himself. Since then the flowers have been blushing for their involuntary connection with the affair. "June bud" applied to our species is apparently a hybrid between "Judas tree" and "red-bud". "Salad tree", a name given in the books, is inexplicable.



NOTE *and* COMMENT



DATURA METELOIDES.—The desert trumpet flower is frequently offered in the seedsman's lists, but if any of our readers wish to experiment with seeds from the plants shown in our frontispiece, they may obtain packets from this office for ten cents.

GREEN TRILLIUMS.—In certain red-flowered species of plants it is not uncommon to find specimens with white or albinos flowers. Such forms are most frequently noticed in plants whose blossoms are colored by the cell-sap. In flowers colored by minute grains called chromoplasts, white forms are much harder to find; in fact, it is rare to find such blossoms without a trace of other colors. Usually the color of the specimen is greenish or yellowish white. In the older books, *Trillium erectum* is credited with a whitish variety, *alba*, but this so called variety is now known to be a distinct species and bears the name of *Trillium declinatum*. The modern manuals retain a green-flowered species of trillium as *Trillium viride*, but those who are familiar with *Trillium sessile* in the field are inclined to regard the green form as a mere variation. It has no distinctive habitat but occurs mixed with *T. sessile* almost anywhere. A more interesting form is a yellow-green specimen of *Trillium reflexum* brought to our attention by Mrs. Everett Lewman. In this the petals are somewhat enlarged and leaflike and of a pale greenish-yellow. The claws of the petals are of the familiar brownish-red as

are the stamens also. It is of course, only a color form, but to distinguish it we may call it *Trillium recurvatum* forma *luteum*.

CULTIVATING TRAILING ARBUTUS.—It is commonly believed that it is impossible to grow the trailing arbutus (*Epigaea repens*) in the garden. This opinion has some foundation in fact for an immense number of attempts have been made to domesticate it without success. Until recently the fact that this plant, like so many other heaths, prefers an acid soil was not sufficiently appreciated. That the plant can be induced to bloom in an ordinary flower-pot in the greenhouse by giving it the proper soil conditions, is by this time well known. All that seems necessary is to pot it in an acid soil of the "upland peat" type, formed from the decay of oak leaves. Last August it occurred to the editor of this magazine to make another attempt to grow arbutus in the garden. A small clump of the plant was dug up in Michigan and transferred without delay to a spot on the north side of a wall where the soil is sand mixed with humus from an upland oak wood. It is gratifying to record that the plants bedded with oak leaves, came through the recent rather trying winter unharmed and have since produced an abundance of blossoms. Reviewing this experiment, it seems quite likely that protecting the plants from the sun in the winter is quite as important as the character of the soil in determining their survival.

COLOR OF CAROLINA ANEMONE.—That diminutive and early flowering species of anemone known as *A. Caroliniana* is apparently not a familiar plant to the makers of popular books on wild flowers; at least not a single volume that we can find, even mentions it. It is, however, a very attractive little plant with roundish leaves ternately divided and the divisions again variously toothed and lobed. From the midst

of these leaves springs a single flower which Wood says is fragrant but which does not appear to be always so. Possibly it is owing to its rarity that technical botanists fail to agree on its color. Gray calls it purple, or whitish; Britton makes it purple varying to white and Wood calls it white or rose-colored but adds that the outer sepals are dotted with purple. It is difficult to understand what these authors mean by purple. The purple of the ancients was what we would call a brilliant red, nearly the color of the British flag. Modern purple is supposed to run all the way from lilac and violet to mauve, but as long as we have these separate names for the different colors or shades it is scarcely scientific to lump them all under the term purple. In the vicinity of Joliet, *Anemone Caroliniana* is fairly abundant and the plants conform to the book descriptions in having white flowers varying to rose-color. There is in addition a form exactly matching in color the early violets and this form does not appear to intergrade with the others. In order to give it a distinctive name we may call it *Anemone Caroliniana* forma *violacea*. It resembles the type in everything save the deep violet-colored flowers.

WESTERN PLANT NAMES.—The various species of *Brodiaea* are known as "fool's onion," the leaves, flowers and bulbs closely simulating *Allium*, but wholly without alliaceous taste or odor, so that the hungry traveler who thinks he is going to have a feast is badly fooled! *B. Douglasii* is sometimes known as "wild hyacinth," though, as you remark, this name more properly belongs to *Camassia*. The many species of *Calochortus* are collectively known as "Marioosa lily," and locally in Western Oregon as "cat's ear," from the fine wool on the inside of the petals. This name properly belongs to *Hypochaeris radicata*, which in the Northwest re-

places the dandelion as the chief lawn-weed. The native species of *Fritillaria* and especially *F. pudica*, are known as "rice-root" or "Indian rice," from the small pearly-white bulblets, shaped almost exactly like grains of rice. *Erythronium giganteum* is known universally in Oregon as "lamb's-tongue"—probably from the shape of the leaves. *Zygadenus venenosus* is the plant commonly known as "death camas." Our only *Stenanthium*, *S. occidentale*, is too infrequent to have any common name. I know a farmer who stubbornly persists in applying the name "death camas" to *Muscari comosum*, which is well established on his farm. *Xerophyllum tenax* is known as "pine-lily," or more frequently as "bear-grass." The long, tough leaves are used by the Indians for basket-making. The Californian *Chlorogalum pomeridium* which occurs also in southwestern Oregon, is called "soap-weed" or "soap-root," because the roots make a soapy emulsion in water.—*J. C. Nelson, Salem, Oregon.*

FRUITS OF JAPANESE QUINCE.—Paul Winkler writes from Dallas, Texas, that *Cydonia Japonica* bears fruit quite often in the South or even as far north as Southern Kansas. "The fruit seems to stay on the bushes nearly all winter", he says, "Only four days ago [Jan. 20] I noticed a plant with about ten large fruits. I wonder if the climate has something to do with the color of the fruit. The ones I saw in Northern Oklahoma were yellow-brown all right but the ones I see here in Northern Texas are bright yellow. Bailey's Cyclopedias is right in the latter case."

CHAPTALIA.—In March the wet grounds in the pine barrens from North Carolina to Texas are usually sprinkled with small, white, daisylke flowers which rise on scapes from a rosette of lanceolate leaves densely woolly beneath. It is an unassuming little herb but one quite remarkable from the fact that it is the only member of the Compositae or aster

family in North America in which the disk-flowers are two-lipped or bilabiate as the botanist has it, like the flowers of sage or snapdragon. Under the lens the tiny flowers are seen to have a three-lobed lip on the side toward the exterior of the flower-head and a two-lobed lip toward the center. The ray-flowers are usually white but sometimes they are tipped with red giving the flower-head somewhat the appearance of the English daisy. In books whose nomenclature follows the "American" Code the plant is called *Thrysanthema semi-flosculare*. That spring had reached North Carolina by the middle of March was attested by specimens of this plant in bloom sent by H. A. Rankin of Hallsboro.

CHANGING THE SEX OF PLANTS.—The majority of plants have stamens and carpels in the same flower but a good many others vary this arrangement. In some cases the stamens and carpels are on separate plants as in the willow and cottonwood; in others they are on different parts of the same plant as in the pines and maize. In the group of which the Jack-in-the-pulpit or Indian turnip (*Arisaema triphyllum*) belongs, some plants bear only carpels, some bear stamens, and some a mixture of the two. This condition suggests that the sex of such plants is not so rigidly fixed as it seems to be in other plants and might not be incapable of change. Among some of the lower plants, sex often appears to be determined by the food supply. In some of the ferns the prothallia grown on sterile media may produce nothing but sperms similar to the pollen elements, while an abundance of food results in archegonia containing eggs such as are found in the carpels. A similar conditions exists in the gametophytes of *Equisetum* and *Selaginella*. In the *American Journal of Botany* for February, Dr. J. H. Schaffner records his experiments with the Indian turnip and its ally the green dragon (*A. draconium*) in try-

ing to discover if feeding has any effect on the sex of plants. By proper manipulation of the food supply he was able to change staminate plants to carpellate plants and vice versa. More remarkable still, after turning carpellate plants into staminate plants, he was able to turn them back to carpellate plants again the following year. It seems likely that the completely staminate plants found in nature may be plants that were exhausted the previous year by seed production. Somewhat similar conditions have been found by Dr. Schaffner in the hemp (*Cannabis sativa*) and by others in *Mercurialis annua*. Dr. Schaffner concludes his paper with the following: "In nature, we see quite generally the existence of positive, negative, and neutral conditions and the physicist is inclined to interpret these conditions in terms of positive and negative electricity. Whatever the fundamental cause of the positive and negative state of matter will be found to be, it will probably also give a clue to the remarkable duality and dimorphism which we call sexuality and which is a characteristic of all plants and animals except the very lowest".

PITCHER-PLANT INDOORS.—I doubt if it is generally known that the pitcher-plant (*Sarracenia purpurea*) is a plant which takes very kindly to life indoors in winter. A friend of mine was presented with two thrifty plants at Thanksgiving-time in 1921 and told that they might live until Christmas. They were set in moss in a fairly deep dish in which water was kept standing as well as in the pitchers. They were kept with other plants on a stand in front of a south window. It is now three months since the plants were brought into the house and they are as fresh as at first and are sending up new leaves. While teaching in a little country school in New Hampshire several years ago, the children brought me a pitcher-plant which we placed in an old tin basin and kept where

it received no sun at all. In a few weeks it surprised us by sending up a flower stalk and we had the pleasure of watching the bud develop into a flower. It would be interesting to hear from others who have experimented with this plant in winter.

—*Mrs. Viola F. Richards, South Deerfield, Mass.*

COLOR COMBINATIONS.—Every locality I have been in could lay claim to superior beauty of its color combinations at some season. The most striking were the sweeps of primroses and forget-me-nots on the upper slopes of Pike's Peak. Of course the effect was intensified by the absence of trees, the background of immense bare cliffs, and the wonderful blue of the sky. The purple mists of pentstemons that drift over the foot-hills of Colorado in July are no more wonderful than the crimson flames of paint-brush (*Castilleja*) that kindle the Wyoming ranges in June. The golden blaze of ten thousand acres of rabbit-brush in September is no more beautiful than the gray film that clouds league after league of sage land in the hunting season. Our own local colors are blue and gold, the blue from dense acres of Wasatch beard-tongues sweeping up to steeps densely sodded with dwarf sunflowers and visible for miles in June when the lower gravel hills are red from the ripening *Bromus tectorum*, locally called June grass.—*Mrs. M. E. Soth, Pocatello, Idaho.*

THE BLUET IN WINTER.—A very common little plant has been the source of much pleasure to me during the winter. This is the modest bluet (*Houstonia coerulea*). The time to secure these plants for winter use is in autumn after several severe frosts have occurred. By careful search of those places in which you remember to have seen the bluets in bloom you will be able to find the tiny round leaves, now rather brown but quick to respond to warmth and moisture. Take up several of the little clumps—it is not necessary to have much earth

with them—and set them in a dish deep enough to hold a little water. Keep water around the roots all the time and let the plants stand in the sunshine. Within a few weeks you will be rewarded by a mass of blossoms. Bear in mind, however, that they will not amount to much unless they have been well frozen.—*Mrs Viola F. Richards.*

ANOTHER LAWN PEST.—Any one who has vainly contended with the moneywort in an attempt to extirpate it from a lawn where it has decided to take up its residence, will not be inclined to dispute your contention that it is the "Worst pest one can get into his lawn". But it has a worthy rival in a plant that has recently appeared in one of our handsomest lawns here in Salem, and that has every evidence of becoming a very tough customer to get rid of. It is the "mouse-ear" (*Hieracium Pilosella*), a small perennial with long stolons that lie prostrate in such a way as to escape the lawn-mower, and are covered with small leaves that much resemble those of *Antennaria*. Within 24 hours after the mower has gone over the lawn, our plant sends up a slender scape some 10 cm. high, bearing a solitary pale-yellow dandelion-like head at the summit, which matures seed before the next trip of the mower, and continues this game of hide-and-seek all summer. It spreads very rapidly, and apparently nothing but a complete plowing and sifting of the soil will eradicate it. The plant seems to be well known in the East, but I can find no record of its previous appearance in Oregon.—*J. C. Nelson, Salem, Oregon.* [In the third volume of this magazine a form of *Prunella (P. vulgaris var. nana)* was described which differs from the type by lying flat on the ground and rooting at every joint. This is a good example of a machine-made species for it is only common in lawns and appears to have taken on the

new form to avoid decapitation by the mower. As it roots at every joint it is another species hard to eradicate,—ED.]

EVENING PRIMROSE NAMES.—Commenting on the article in the last number, Prof. O. A. Stevens writes: "The species to which the name *pallida* is applied is a night blooming one, but we have a closely related one, *pinnatifida*, which appears to be day-flowering according to my observations. There has been considerable confusion in the use of these names. I notice also that you do not mention the species *serrulata*, a very common day-flowering plant of our prairie region. I do not know whether it has ever been cultivated or whether it is capable of being so. The *Pachylophus* is truly a beautiful thing, growing as it does with us on the bare buttes in the Bad Lands. I have a very distinct recollection of trying to collect seeds from it and finding the crowns so woody that I nearly wore out my fingers trying to twist out the capsules".—[The species called *pallida* is apparently a stray from farther west. A confusion of names is likely responsible for the misapplication. The form named is day-blooming where we have seen it growing. ED.]

LILIES FROM SEEDS.—With regard to your note on Easter lilies from seeds in the February number it may be interesting to mention a hardy lily that is easily raised from seeds. I have reference to *Lilium regale* the new lily from China introduced by Professor Wilson of the Arnold Arboretum several years ago. The gardener on the Dukes farms, Somerville, N. J. sowed seeds of this lily in the green-house during January, transplanted the seedlings to well prepared beds in the summer where by fall they had developed bulbs of considerable size. These he lifted and stored for the winter setting them out again in the early spring. A large percentage of them flowered the following July. A year later, having been left undisturbed, they produced a full crop of flowers. Thus

a period of eleven actual growing months was all that was required to flower this lily from seed. The bed referred to is about six feet by seventy-five and was certainly a wonderful sight. The harmonious blending of pink, white and yellow in the otherwise Easter lilylike flowers, combined with the graceful narrow leaves that clothe the stems make this lily indispensable as a choice flower in midsummer. Its delicate fragrance is another asset by which it is assured a prominent place in American gardens. The possibility of producing hybrids of this lily are very great because of its seed-producing qualities and the comparative ease with which it can be raised from seed. It has been predicted that it will be the Easter lily of the future, having been successfully forced for that event.—*R. M. Crocket, Cranford, N. J.*

DUTCHMAN'S-BREECHES POISONOUS.—At a recent meeting of the Torrey Botanical Club it was reported that the common plant of the Fumitory family known as Dutchman's-breeches (*Dicentra cucullaria*) and its congener the squirrel-corn (*D. Canadensis*) are poisonous to cattle. The poison is said to be most abundant in the "bulbs" as the underground portions are sometimes called. That these plants are poisonous is not surprising when it is recalled that they are rather closely related to poppies, moonseeds, buttercups, aconite, and others with suspicious reputations.



EDITORIAL



The United States Civil Service Commission in announcing an examination for scientific assistants requires among other things that applicants shall have a college degree. In this manner does the Commission set the seal of its approval upon the proposition that practical horticulturists, animal husbandmen, dairymen and the like are inferior to the college-made variety. As a matter of fact, college teaching runs so much to theory that the individual who received his training in some practical horticultural or agricultural establishment is often far superior to the man with a degree. It is quite natural that those with college degrees should be prejudiced in favor of others with similar qualifications, but it is manifestly unfair to an immense number of able men who secured their knowledge without being tagged by a university. Some provision should be made to admit to the examinations those practical people who can deliver all the goods but the degree. The attempt to exclude from the Government service in this nation of more than a hundred million people everybody except the college man is a piece of beureaucracy that a free people ought not to tolerate. With reference to the system the *National Republican* well says: "The scheme of selecting government employees by scholastic examinations is so asinine that no private business has ever thought of imitating it. In the stupidity of that method of picking employees the Government stands alone—forced into the position not by public sentiment but by the machinations of theorists." The jobs for

which one must submit a degree and write a thesis, pay from \$1350 to \$1850 a year. If this is the best that college graduates can do, they would have better taken a course in plumbing or brick-laying.

BOOKS AND WRITERS

The appearance of a second edition of Dr. William T. Trelease's "Plant Materials of Decorative Gardening", four years after the original volume was issued, is an encouraging sign of the growing interest in living plants. The volume is devoted to woody plants of which nearly twelve hundred forms are enumerated with keys for their determination. This great number includes, of course, practically all the woody plants in cultivation, exotic as well as native. All this is comprised in a volume of 175 pages and has been made possible by the use of the most concise and direct keys. The book is a companion volume to the author's larger work on "Winter Botany" wherein many of the species discussed are figured and more extensively described. "Plant Materials" is a book that the gardener, the nurseryman, the landscape architect and all others who come much in contact with the woody plants can scarcely do without; a fit companion to many more pretentious works on trees, shrubs and vines. The new volume has been thoroughly revised and brought up to date. It is for sale by the author at Urbana, Ill., for \$1.00 postpaid.

Somewhere near the lowest stratum of the plant kingdom occurs an immense group of plants which lack chlorophyll and which, therefore must get their nourishment as animals do, ready made from other living things. Part of this vast aggregation, known as parasites get their food by attacking living plants and animals often causing their death; another and

much larger group, called saprophytes, do not attack plant and animal bodies until dead though they may live on matter excreted by living things. In the latter group there is great diversity of habit and habitat. The minute species often select the most unusual places for growth. One lives in the human ear, feeding on the secretions from its lining, another is restricted to the hoofs and horns of animals. Some occur only on burnt ground and one lives on old rope or paper. Still another lives on wasp nests and a large number grow on the droppings of different animals. Some kinds find their existence limited to a single species and if they do not find this species they do not survive. One is confined to the dead stems of the bullrush another to rotting beech wood, another to maple etc. Other forms have a wider choice of habitats but still are confined to single families of plants as the grasses or cresses. There is still another group of nearly ten thousand species that pass practically half their life cycle on one species of plant and then change to another. A group so large and so varied as the one we have described cannot be adequately presented in a single volume and it is customary for authors to select some division of it for treatment. Among favorite groups for such selection are the bacteria, the yeasts and the mushrooms. In a new volume by Dame Helen Gwynne-Vaughan, professor of botany in the University of London, the Ascomycetes, the Uredinales and the Ustilaginales are discussed. The book is an octavo volume of 230 pages and bears the title of "Fungi". It is one of the Cambridge Botanical Handbooks being issued under the editorial supervision of A. C. Seward and A. G. Tansley. The author has packed into the book an unusual amount of significant material which brings our knowledge of this group of plants up to date. Owing to the technical aspects of the subject the

volume can scarcely be described as entertaining to the general reader, but all who have a working knowledge of the forms discussed will find it very valuable. The general reader with a taste for investigation will find it interesting for the text is clearly written and illustrated by nearly two hundred accurate drawings. The mycologist will welcome the very extensive bibliography which follows each section. The volume is bound in green cloth and is for sale on this side of the world by The Macmillan Company of New York.

Among the familiar sights of our spring woods are patches of shining red, orange, or white that appear on dead leaves, rotten logs, old stumps and the bark of trees, especially where sap has oozed out. Careful observation of such patches show that they are not fixed to the substratum but move about with a slow streaming motion much like that exhibited by the amoeba. These curious patches consist of masses of naked protoplasm which live like fungi on decaying vegetable matter and are apparently among the lowest forms of life. Scientists are not entirely agreed as to whether these forms should be classed as animals or plants, but from the fact that after a preliminary period of growth, the component parts put on cell-walls of cellulose and form sporangia containing spores they are pretty generally regarded as plants. The group has been variously named Myctozoa, Myxogasters, and Myxomycetes, but the last mentioned name seems to have the preference. To the field naturalist they are all "Slime Moulds". There are about three hundred species in America but the only botanist who knows much about them is Dr. Thomas H. McBride who has spent the greater part of a lifetime in their study. As long ago as 1890 he published a monograph on the "Myxomycetes of Eastern Iowa" and in 1899, he expanded this into a little book on "North American

Slime Moulds". This volume, which is the only one on the subject, has long been out of print, but it has now been reissued in a new and enlarged form containing 300 pages of text and twenty-three full page plates in which the species are illustrated. A number of new species have been included. In the slime moulds the student is not perplexed by the necessity of a choice between different works on the subject. It is fortunate, therefore, that the only volume is accurate, authoritative and the matter attractively presented. An examination of the book is enough to make the lover of outdoors want to take up the study.

The lupine is now in its glory. It is the most important because it occurs in such extensive patches, even an acre or more together, and of such a pleasing variety of colors, purple, pink, lilac and white, especially with the sun on it when the transparency of the flower makes its color changeable. It paints a whole hillside with its blue, making such a field (if not meadow) as Proserpine might have wandered in. Its leaf was made to be covered with dewdrops. I am quite excited by the prospect of this blue flower in clumps, with narrow intervals. Such a profusion of the heavenly, the Elysian color, as if these were the Elysian Fields. That is the value of the lupine. The earth is blued with it, yet a third of a mile distant I do not detect this color on the hillside. Perchance because it is the color of the air. It is not distant enough. You may have passed along here a fortnight ago and the hillside was comparatively barren but now you come and these glorious redeemers appear to have flocked out all at once. Who plants the seed of lupines in the barren soil? Who watereth the lupines in the field?—HENRY D. THOREAU.





HORSE-MINT.—*Monarda punctata*

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No. 3

*Fringing the stream at every turn,
Swung low the waving fronds of fern:
From stony cleft and mossy sod
Pale asters sprang and goldenrod.*

—Whittier.

OLD GARDEN FLOWERS—III

THE MONARDAS

NO matter what other treasures the old-fashioned garden might possess, it was never complete without its clump of bee-balm (*Monarda didyma*). Though tucked away in some remote corner, the glowing scarlet of its blossoms served to light up the garden as few others could do; in fact, this plant seems especially designed by nature to grow in masses against a background of other vegetation and to be endowed with sufficient color for all. More permanent than the scarlet salvia, more amenable to cultivation than the cardinal flower and unsurpassed in brilliance of color by either, it is a most satisfactory addition to the garden beds and borders. Even when not in flower it has some claim to our attention for its leaves, permeated with a warm, aromatic oil afford a pleasing fragrance that serves to distinguish it from others of its class as the fragrant balm.

The species of *Monarda* that have been taken into our gardens have been little changed from the wild state, with

the exception of various color forms developed by cultivation. *Monarda didyma* still outlines dripping rocky outcrops with its brilliant blossoms or colonizes sunny glades on the shores of river or lake, *Monarda fistulosa* spreads in solid sheets of lavender over hundreds of square miles of prairie, and *Monarda punctata* gives to the sandy wastes an air of cheerful thrift in spite of heat and drowth.

The flowers of the monardas are slender, curved and two-lipped. Though individually of no great size, their habit of growing in compact little rosettes at the tips of the stems make them quite conspicuous. In this they are helped out by the floral leaves or bracts which commonly take on something of the colors of the flowers themselves. In the case of *Monarda punctata* shown in our illustration, this has gone so far that the bracts have become the most conspicuous parts. The flowers are rather insignificant, yellowish in color and spotted with purple within, but the bracts are large, white or purplish and most attractive.

As might be expected, the scarlet forms of *Monarda* are most sought after for cultivation. Of these, the bee-balm or Oswego tea (*M. didyma*) is easily first. Various other red and purple forms are found in the dealers' catalogs as forms of *Monarda fistulosa*, but these are regarded as separate species at present. As usual, white forms are also to be obtained. True *Monarda fistulosa* has lilac or pink blossoms. The horse-mint (*Monarda punctata*), though not as brilliant as its sisters is still an attractive plant, especially desirable for dry grounds where few other things will grow. *Monarda clinopodia* is a species of no great attractiveness which ranges south to Georgia. It has whitish flowers and is seldom cultivated.

The Monardas will grow in any good garden soil, in either sun or shade but thrive best when given a sunny situation and plenty of water. The species are easily propagated by divisions of old clumps in fall or spring.

GARDENING IN AN ARTIFICIAL BOG

By HENRY BIRD, RYE N. Y.

MANY of our native wild flowers take kindly to horticultural uses and landscape architects are recommending natural plantings to a degree never equalled before. To secure the acme of result in such way requires much skill and experience, but the successes are being duly appreciated. Not a few of the acid soil plants and shrubs are valuable in this line, but they are tabu except when their transference happens to be to a situation closely resembling their original habitats. The true bog plants have much to recommend them in some instances but success in their case requires an understanding that makes appeal to botanists rather than others.

Mention of the successful transplanting of trailing arbutus and the northern pitcher plant recently in this magazine, indicates that commendable human attribute which ever seeks to do the difficult and unusual. The writer's efforts in the artificial acidulation of soils has found outlet in the production of an artificial bog which may appeal to botanists and is not without artistic possibilities in its horticultural development. *Arbutus* and *Sarracenia*, woodland orchid types and the swamp *Helonias*, sundews and gentians, may be brought together in the space of a few square feet in a manner one never

sees quite duplicated in nature. It is not difficult to grow all the *Sarracenia*s in the latitude of New York City, and if a majority of these species be represented and made to form a principal feature of the planting, a pleasing result is assured. To be able to follow these interesting types, have them bloom and exhibit their anomalous features of entrapping insects while at the same time others find immunity and their sole habitat within these wonderfully adapted pitchers, in ones own garden, is a privilege, and the trouble in the beginning is soon forgotten in subsequent gratification. The recent work of Jones, Hapburn and MacFarlane in checking up the old and adding new data on the many sided question involved in these plants takes on a new meaning when such striking types may be seen standing one beside the other. And of this category it is always of interest to point to *Dionaea muscipula*, that plant characterized by Darwin as the most wonderful in the world.

To enhance an extension of the environmental or ecological possibilities of the suggested bog, the aim has been to produce an acid content where such plants as *Sphagnum*s and sundews for moist types, and *Fissipes acaulis* of drier ones, plants usually associated with maximums, may get on with what may be their minimum requirements, thus allowing a condition of limited acidity, open to a vast number of species.

While the plants themselves act in a large measure as indicators of their acid requirements, the work of Wherry in computing the intended data he has given us, simplifies and suggests much that may be done in this line. It may seem anomalous to bring together plants redolent of moisture in juxtaposition with those of thin soil or well drained situations: to coningle habitats as divergent as Canada and Florida, but it only demonstrates that moisture and temperature lose much

of their significance when a sufficient acidity is met.

An experimental bog may be no larger than an area six by nine feet. It should copy the natural bog in being an entrapped drainage area; be sheltered thru depression; secure an "acid" content by the use of the tannin residues such as the commercial extracts of oak or hemlock bark, as they come in concentrated form prepared for the tanning trade.

These bark extracts dilute readily in water, contain a very minute percentage of acid, but seem to develop a rather marked amount as their constituents undergo chemical change in moist soil. Thru a continuous supply of the tannin, favorable conditions arise for growing the more pronounced types of so called acid soil plants, and because of this, at a degree much less than that of their usual habitats. That is, the tests by the Wherry method using the LaMotte indicators, show we may grow arbutus, pink lady slipper and buckbean for instance, at thirty points or less beyond neutral, whereas one rarely finds a natural station for them except it be well beyond that point.

For such a six by nine planting we recommend the following procedure. Select some situation in full sun, and excavate an area of seven by ten feet down to a depth of three feet. At the bottom a saucer of puddled clay must be formed, two cubic feet of such material being needed. Having donned rubber boots and moistening the clay at intervals it can be trodden into proper consistency, about that of a stiff putty. It may then be shaped into a saucer with a mason's trowel to a thickness of ten inches with edges arising as perpendicularly as possible on the inside, and its finished periphery conforming to the six by nine feet required. The edges should run up so that there is a depth of about sixteen inches in the center

of the saucer, and when thoroughly dried out the basin may be filled with sand and wood soil, two parts to one respectively, finishing the surface so that the center is four inches lower than the sides. Since this level is yet about a foot below the ground line an arrangement of planking like a hot bed frame should be built to hold the adjoining soil and keep out surface water. With such a wooden coping the southern plant life can be protected by three hot bed sashes in winter, and lath screens be applied in very hot midsummer weather or on occasion of damaging windstorms.

In applying the bark extract, our plan is to sprinkle once a week or oftener at the start, using one half pint of the extract diluted in ten or twelve gallons of water. If this quantity of extract is mixed in two quarts of tepid water first, a better suspension is obtained. Other waterings may be with the garden hose—the bog is never expected to maintain standing water, but must always be thoroughly moist.

From its concave surface most moisture will accumulate at the center of the bog, and here sundews, pitcher plants, etc., should be placed, while the sides can support the drier types. Of course water that is decidedly limey should be avoided and no fertilizers countenanced. The earthworms will soon become established and help build up humus, and in transplanting, the introduced plants should have plenty of soil about their roots, thus bringing in bacteria that thrive where tannin abounds.

As to adaptable plants, the list is large. Due to restricted area, small and low-growing ones must be used and if in addition to a botanical experiment the artistic possibilities be considered, the Orchidaceae at once suggest themselves. The more adaptable of these like *Cypripedium parviflorum* may

luxuriate in two seasons as we have seen, from a three crown plant to one supporting twenty six flowering stems. When this and its immediate relatives hold sway, a floral effect is easy. Following this array, the *Sarracenias* become in evidence, first with their peculiar flowers and for the remainder of the season their pitchers form a dominating feature. *Drummondii* and *flava* are very effective and though not so robust as in southern climes, their pitchers attain a height of nineteen to twenty inches at Rye. A congeniality for mosses and ferns abounds, but we have restricted the single species *Lorinseria areolata* for a border fringe to hide the woodwork.

The following list of plants are those most conspicuous with us, are luxuriating normally, have for the most part flowered and show a commingling of types which point to the extent acidity may bridge differences of moisture and gaps of isotherms.

| | |
|---------------------------------|------------------------------------|
| Sphagnums and other mosses | <i>Limnorchis dilatata</i> |
| <i>Camptosorus rhizophyllus</i> | <i>Blephariglottis ciliaris</i> |
| <i>Lorinseria areolata</i> | <i>B. blepharigottis</i> |
| <i>Juncus effusus</i> | <i>Limodorum tuberosum</i> |
| <i>Lycopodium complanatum</i> | <i>Ibidium strictum</i> |
| <i>L. lucidulum</i> | <i>I. gracile</i> |
| <i>L. olscurum</i> | <i>Helonias bullata</i> (Delaware) |
| <i>Xyris sp.</i> | <i>Clintonia borealis</i> |
| <i>Coptis trifolia</i> | <i>Hepatica acutiloba</i> (Can.) |
| <i>Cypripedium reginae</i> | <i>Bicuculla cucullaria</i> |
| <i>C. parviflorum</i> | <i>Sarracenia purpurea</i> |
| <i>Fissipes acaulis</i> | <i>S. flava</i> (S. C.) |
| <i>Galeorchis spectabilis</i> | <i>S. Drummondii</i> (Fla.) |
| <i>Gymnadeniopsis integra</i> | <i>S. minor</i> (S. C.) |
| <i>G. clavellata</i> | <i>S. rubra</i> |

| | |
|--|---|
| <i>S. psittacina</i> (Fla.) | <i>Kalmi latifolia</i> (seedlings) |
| <i>Drosera rotundifolia</i> (Fla.) | <i>Gaulussia brachycera</i> (from primitive Penna. plant) |
| <i>D. filiformis</i> , var <i>traceyi</i> (Ala.) | |
| <i>Dionaea muscipula</i> (Carolina) | <i>Vaccinium</i> sp. |
| <i>Silene caroliniana</i> | <i>Oxycoccus macrocarpus</i> |
| <i>Sedum ternatum</i> | <i>Sabbatia</i> sp. |
| <i>Heuchera</i> sp. | <i>Gentiana crinita</i> |
| <i>Rubus hispida</i> | <i>Dasytessphana andrewsii</i> |
| <i>Epigaea repens</i> | <i>Menyanthes trifoliata</i> |
| <i>Gaultheria procumbens</i> | <i>Mitchella repens</i> |
| <i>Viola lanceolata</i> | <i>Houstonia coerulea</i> |
| <i>Rhexia virginica</i> | <i>Shortia galacifolia</i> |
| <i>R. mariana</i> | <i>Ionactis liniarifolius</i> |
| <i>Chimaphila maculata</i> , | ? <i>Coreopsis</i> sp. (adventive |
| <i>C. umbellata</i> | seedling from Fla.) |

BOTANY FOR BEGINNERS III.

By WILLARD N. CLUTE.

THE whole subject of plant growth seems an inscrutable mystery to the average individual. He is wont to imagine that plants spring out of the earth much as wool grows on a sheep, entirely overlooking the fact that plants are living things derived from pre-existing individuals and therefore more or less related and not the product of natures vagaries. It is a common failing for him to regard any unusual flower he encounters as the only one of its kind or, if instead of a single plant, a colony is discovered, he is disposed to insist that his is the only place in the world where the plant grows.

The American lotus or *Nelumbo* is often credited with this kind of distribution, or rather, lack of it. The plant is so remarkable in both leaf and blossom as to attract the attention of everybody who approaches it and its comparative rarity naturally leads to unwarranted conclusions.

To be sure there are various plants that inhabit very limited portions of the earth's surface. The Venus' fly-trap, for instance, is found only in the North Carolina marshes near the coast, and the insectivorous *Darlingtonia* is known only from the sierras of California and Oregon, but most plants are more widely distributed. Nor is such distribution hap-hazard or disconnected. Each kind of plant has a definite range that in the case of all ordinary forms can be indicated with considerable exactness. In general, plants are supposed to have spread outward from their point of origin until they encountered some barrier to their further progress, and thus are confined to very definite areas. There are, however, certain phases of distribution that have ever been a puzzle to botanists. Among these are the occurrence of colonies of the hart's-tongue fern in central New York and in Tennessee but nowhere else in America. The plant is common along ditches and hedge banks in England and the question is still how the colonies arose in the Western Hemisphere. Another fern *Asplenium alternans*, is found in a single canyon in Arizona and not encountered again until the Himalaya mountains are reached, more than ten thousand miles away! In some cases, when there are outlying colonies at a distance from the main body of the species there is evidence to show that the species was once more widely distributed and has since contracted its area, but in other instances the species may be extending its range into new territory. Reports of

plants far beyond their known limits are now matters of frequent occurrence. Classic illustrations of the extensive spread of species in historic times may be found in the behaviour of the prickly pear in Australia, of the water-weed (*Elodea*) in Europe and of the prickly lettuce and Russian thistle in our own country.

Sooner or later, the most persistent species must reach a barrier that limits its further progress. Such barriers are naturally most diverse and their importance often depends upon the species, for what constitutes an insuperable barrier to one species may prove to be no hindrance to another. An extensive forest may bar the spread of plants that thrive on plains or prairies, and a desert or large body of water be an efficient barrier to woodland forms. Indeed, the desert might limit the forest while offering new regions for colonization by plants of the plains.

The effect of temperature on the distribution of species is a familiar one, for we see a cold period annually put an end to many kinds of tender vegetation and realize that the northward extension of any species must ultimately be limited by the cold. That an increase in temperature may prove harmful to other species is not so well known but a consideration of the plants of the world show an immense number that cannot endure any great increase in temperature and when brought into milder regions die because the weather is too warm. We may even account for the fact that the tree flora of Europe is not as rich as our own by a matter of temperature, for it is known that the last great ice-sheet which covered the northern hemisphere pushed the plants southward until they were stopped by the mountain chains across their path and thus obliged to perish, while in our own country the north

and south trend of the mountain ranges allowed our plants to elude the ice sheet and to migrate back into territory formerly inhabited after the ice sheet had retreated.

It not infrequently happens that one species is limited in its distribution by its dependance upon another species. Fungi and such parasitic flowering plants as the dodders and some orchids cannot, of course, be distributed farther than the range of their host plants. The chestnut blight must come to an end as soon as all the chestnuts and chinquapins are destroyed unless it learns to live upon some other species in the meantime. Even more curious are those ranges that are modified by insects which pollinate the blossoms and thus ensure a continuance of the stock. The yucca and the yucca moth, for instance, are so closely interdependent that one cannot long survive in a locality or spread into new regions, without the other. It thus happens that the draining of a swamp or the cutting down of a woodland in one part of the country may destroy the feeding grounds of some insect that aids in maintaining a very different species in some other area.

It is only in recent years that we have come to realize the important part the soil plays in the distribution of plants, but we now know that vegetation can be divided into two great groups depending upon whether they are tolerant or intolerant of acid in the soil. Most plants, especially the common plants of our gardens, do not thrive in a soil that is acid, but many others absolutely refuse to grow in any other. The rhododendron, azalea, huckleberry and trailing arbutus belong to this group, not to mention various water ferns, violets, and bog-plants generally. It is apparent, therefore, that it is not mere accident that determines where a plant shall grow. Each species does the best it can under the circum-

stances and occupies as much territory as it can conquer for itself. But often fine and, in many cases imperceptible differences in soil or climate make an area unfitted for the survival of a given species though in no wise inhabitive to some other. Thus have come about the willow thickets, walnut groves, oak forests, berry patches, alder swamps, sphagnum bogs, wintergreen colonies and many more. Even one who has had no botanical training recognizes the difference between two such regions though often unable to state it in words. He does not hunt for pitcher plants on hillsides nor for sassafras in swamps. Among the upland forests of pine, oak, and hemlock we may find arbutus, sweet-fern, wintergreen, and huckleberries, while in the maple-covered lowlands grow the bloodroot, hepatica, violet, and phlox.

Although each species is at present spread as far as possible in every direction, various natural agencies may at any time open new fields for further colonization. The great barriers of the earth, however, such as mountain chains, deserts, oceans and the like ultimately divide vegetation into fairly distinct groups. Thus the flora of the Northeastern States differs in its major aspects from that of the Gulf States, as both differ from the flora of the Pacific Slope or of the Great Plains. But while a given species rarely extends far beyond the boundaries thus set, it is the usual thing to find other species very much like it in adjoining regions. It is likely that all may have arisen from a common stock at some time long in the past, but in adapting themselves to different conditions have taken on different characteristics which forever distinguish them.

IMPORTANT MOVEMENTS OF PLANTS-II

BY JOHN J. BIRCH

CIRCUMNUTATION OF ROOTS

NOT only do the stems, leaves and stolons circumnute but the radicals, hypocotyls and epicotyls of the seeding plants as well, even before they emerge from the ground. In all germinating seed, the first change is the protrusion of the radicle, which immediately bends downward and endeavors to penetrate the ground. There is a movement of the root tip which bores thru the soil and in this way makes a place for the root. Then as the root grows and fills up the hole, the cells become more numerous and exert a pressure on the side sufficient to force the earth away, and in this way, due to the close packing of the earth around the root, it is able to come in direct contact with materials for growth. The movement of the radicle, also guides it along the line of least resistance as when the root happens to break obliquely into cracks or into burrows made by earth worms or larvae. This movement, combined with the sensitiveness of the tip to contact, is of great importance, for as the tip is always endeavoring to bend to all sides it will press on all sides, and thus be able to discriminate between the harder and softer abutting surfaces, thus guiding the root. Consequently it will bend from harder soil to the softer soil, materially aiding the plant.

There is no structure in the plant more wonderful, as far as its functions are concerned, than the tip of the radicle. If this be lightly pressed or injured it transmits an influence to

the upper parts of the root, causing a bending away from the affected side. The tip also can distinguish between slightly harder and softer objects to a marked sensibility. One might compare the tip of the radicle to the nervous system of animals.—it receives the impressions and then by some marvelous methods directs the organism.

Several other factors which will be discussed later are active in determining the direction of growth. In almost every case however, the final purpose or advantage of several movements is obviously for the life of the plant.

After the radicle has penetrated the soil, the hypocotyls of the dicotyledonous seeds break up thru the ground in the form of an arch. When the cotyledons are hypogean, that is, remain buried in the soil, the hypocotyl is hardly developed and the epicotyl or plumule raises in an arched manner.

The cotyledons after they have broken thru the ground are in constant motion, chiefly in a vertical plane and commonly once up and down in the course of twenty four hours. However, there are many exceptions to such a simplicity of movement. Their upward and downward movements do not exactly coincide, therefore generating an ellipse. In many cases it is found that the cotyledons sink downward a little in the forenoon and rise in the afternoon or evening. Thus they stand rather more highly inclined during the night than during the mid-day, at which time they are expanded almost horizontally. The circumnavigating movement is thus at least partially periodic, no doubt in connection with the daily alternations of light and darkness.

The conclusions reached from the study of circumnutation is that it was not gained for any special purpose, because it is so universal a phenomena; but that it follows in some unknown way from the manner in which vegetable tissues

grew. As more powerful agents, such as light, dampness, obstructions, gravitation, etc. exert their influences the plant becomes susceptible thereto and in this way, new movements were developed, which have become hereditary and necessary for the well being of the plant.

ESPINASTY MOVEMENTS

When the growth is greater longitudinally along the upper than along the lower side of the part, causing a downward bending, the term epinasty is used. The reverse of this is expressed by hyponasty. These are in reality modifications of circumnutation, but because they are so often referred to, the special terms were designated to express them. The organ, under the influence of epinasty does not move downward in a straight line, or upwards under the influence of hyponasty, but oscillates up and down with some lateral movement. However, the preponderant movement is up and down. There is some growth on all sides of the part, but more on the upper in the case of epinasty and more on the lower in that of hyponasty. There may be an additional growth on one side due to geotropism and on another side due to heliotropism, thus increasing or decreasing epinasty or hyponasty.

One of the commonest cases of epinasty is that offered by leaves which are crowded together round the buds at an early age and diverge as the plant grows older. It was believed that this is due to increased growth along the upper side of the petiole blade. As the hypocotyl and epicotyls of some plants protrude from the seed coats in an arched form, it is doubtful whether the arching through the ground ought always to be attributed to epinasty; but when it happens that they are first straight and afterwards become arched, it is in that case certainly due thereto. The arch must retain its

form when surrounded by soil; but as soon as it is freed from that pressure, or rises above the ground it begins to straighten, by the force of hyponasty.

HELIOTROPISM AND GEOTROPISM

The sun is one of the most vital agencies active on plant life. Stems and leaves behave very differently in relation to the direction of light. The stems grow toward the light and the leaves arrange themselves so that the upper surfaces are perpendicular to the sun's rays. Just the reverse of this is the case with the roots; they grow away from the light. This process of auto-turning is called heliotropism. Parts which turn towards the light are described as positively heliotropic, while those which turn away are negatively heliotropic (apheliotrophic) and those which turn across as transversely heliotropic (transheliotropic). There is a fourth case which might be included under heliotropism. The leaves of some plants when exposed to an intense or injurious amount of light, protect their leaves by twisting or rolling them. This is especially noticeable in dry wheather when the plant seems to conserve its moisture by every way possible. Such movements are sometimes called diurnal sleep or para-heliotropism.

When a plant is exposed to a lateral light the stems move at first in a zig-zag line, which is undoubtedly due to its circumnutation at the time, in a direction either opposite to the source of light or transverse to it. As soon as the direction of circumnutation nearly coincides with that of the entering light, the plant bends in a straight line towards the illumination. The course becomes more and more rapid and rectilinear in ratio to the intensity of the light and ellipses tend to have a greater ratio of diameters.

Heliotropism prevails so extensively among the higher plants that there are extremely few of which some part does not bend towards a lateral light. The insectivorous plants are exceptions to this; for it is obvious that they do not live chiefly by decomposing carbonic acid, but it is of more importance to them that their leaves should occupy the best position for capturing insects. Also the stems of twining plants are rarely heliotropic for if they had a tendency to move towards a lateral light, they would be drawn away from their supports. Most tendrils are apheliotropic and thus find supports.

Paraheliotropism has undoubtedly been acquired for a definite purpose. The chlorophyl of leaves is liable to become injured from too much light, and it is believed that it is protected by the most diversified means, such as the presence of hairs, coloring matter, and amongst other means, by the leaves presenting their edges to the sun so that the blades receive the smallest amount of light. It is very probable that this movement has been acquired for the special purpose of avoiding too intense illumination.

It is of paramount importance to the chlorophyl manufacture that the leaves get all the sunlight possible. As it falls on the sensitive protoplasm of the plant, the light sets up, probably by chemical means, a condition of irritation or strain which puts the side toward the light in a condition different from the side away from it, thus favoring the chlorophyl process. This is well shown by the plants growing on a bank or on the borders of a wood. The trees send their greater number of branches towards the open, and in the case of plants growing on a bank, the leaves are so mosaicked that they are not one on top of the other, but each is so arranged that the greater area is presented to the sun. Some botanists have advocated the idea that the angular shape of

such leaves as those of the English ivy are partly determined by the advantage of interlocking to use all the space.

Flowers are extremely heliotropic. They turn their faces directly towards the light that they may receive all the rays of the sun. Some flowers follow the sun through the day, although the adjustment is only moderately effective. Although there is no chlorophyl process active in the flower, yet it becomes evident that if it is to be attractive to insects, the function of conspicuousness requires that the corolla stand out where the light strikes it most fully. As to fruits, they are indifferent to light, which may be due to their weight. However, most fruits are on the ends of the branches where they receive the most light, and it is probable that the amount of sunlight affects the fineness of the fruit as regards size, flavor and beauty.

ASPIDIUM LASERPETIIFOLIUM IN PENNSYLVANIA

By JAMES GRIMSHAW SCOTT

EVER since the discovery of *Asplenium ebenoides*, R. R. Scott in the Schuylkill valley, Pennsylvania, the botanical denizens of the States have been on the lookout for a new specimen of fern that might perchance eclipse it in importance and perpetuate their names in botanical annals.

Recently, Charles H. Pettiford, gardener for W. S. Pilling has found growing in the enchanted wild garden on the Pilling premises in Germantown, an exotic fern that seems to have become thoroughly Americanized in the happy en-

vironment of this notable collection of indigenous plants though which one of the tributaries of the Schuylkill river flows.



ASPIDIUM LASERPETIIFOLIUM.

After repeated efforts to have some local botanist name the fern it was sent to the Smithsonian Institution and the Bronx Botanical Gardens for identification. Both of these authorities agreed in naming it *Aspidium laserpetiifolium*, Mett. and the specific name so much resembles that of its re-

discoverer, we may call this domesticated fern Pettiford's shield fern for purposes of introduction and general discussion.

Mr. Pilling has found among the nurserymen of the vicinity a "commercial" fern somewhat similar to his specimen bearing the name of *Aspidium viridescens* but it has none of the vigor and beauty of the plant growing in the Schuylkill wild garden. The nurseryman's fern appears, in comparison with the domesticated specimen, to be dwarfed and stunted in growth so that the casual observer would not recognize the two to be of a common origin. One is artificial, the other natural. The oriental variety is a species of eastern Asia extending from Tonkin to Japan. Diels lists it as *Polystichum laserpetiifolium*, but Christiansen takes up the earlier name of Moore's and calls it *Polystrichum Standishii* (Moore) C. Chr. It was transferred to *Dryopteris* by Otto Kuntze in 1891 and is in fact, one of the comparatively few species exactly intermediate between these two genera, in this respect resembling *Dryopteris denticulata* (Swartz) Kuntze of tropical America which is often placed in *Polystichum*.

In habit the plant is somewhat polystichoid and for that matter the indusium also suggests *Polystichum* although it is actually orbicular-reniform and attached distinctly to the sinus rather than being centrally peltate. The fern is a handsome one in cultivation and in pursuit of the new policy of the American Fern Society to feature exotic ferns, we commend this splendid plant to their early consideration.

PLANT NAMES AND THEIR MEANINGS—XII

LABIATAE

By WILLARD N. CLUTE

THE species included in the Labiatae are very distinct in appearance. The square stems, aromatic foliage, and flowers in clusters in the axils of the leaves or in a spike at the summit of the stem set them off from other plants and make them easily recognized. The group was naturally among the first to be distinguished when the relationships of plants began to receive notice. The flowers, which usually face side-wise, are two-lipped or "labiate" and from this circumstance the family name is derived. It is to be observed, however that the designation Labiatae is not founded on the name of a genus and according to some botanists should give way to one that is, for instance, Lamiaceae. This latter name has as yet found little favor. The family is occasionally known as the Menthae a title which should prevail if fitness be considered for *Mentha* is the name of the mint genus and mint is the commonly accepted name for the whole group.

The Labiatae abound in showy flowers and in keeping with this fact several genera have names which refer to the blossoms. At the beginning we may introduce *Isanthus* which is formed from the Greek *isos*, equal, and *anthos*, a flower, because the flowers are nearly regular instead of two-lipped as is usual in this group. *Ajuga*, from *a*, without, and *jugum*, a yoke, refers to the fact that the flowers of this genus appear to lack an upper lip to the corolla, *Lophan-*

thus, the name by which the giant hyssop was once known, means crest and flower and alludes to the dense terminal flower-spikes, *Agastache*, the term by which the genus is now designated, has somewhat the same meaning being derived from words meaning much and an ear of corn (wheat). The latter half of the name may also be translated to mean flower-spike as in *Stachys* the name of the hedge nettle. *Pycnanthemum* means "dense blossom" in allusion to the compact inflorescences of this genus.

The genus *Lamium*, from which the family name Lam-iaceae is derived, is by some assumed to come from the Greek for throat, in reference to the open or ringent corolla. Wood, however, says that the name comes from *Lamia* the name of a sea-monster "to which the flowers may be likened." Botanists have seen other resemblances in the flowers of this family to various animals, fabulous and otherwise, as in *Dracocephalum* which is literally "dragon-head". *Leonurus* means "lion's tail" and *Galeopsis* comes from two words signifying weasel and appearance. *Lycopus*, means wolf's foot and refers to the leaves of the plant. *Melissa* also refers to an animal but the reference is suggested by its attractiveness for bees—*mel* is Greek for honey—rather than from any resemblance of the plant to bees.

Scutellaria is from *scutella*, a dish, in allusion to the shape of the calyx, and *Trichostemma* is from Greek words meaning hair and stamen and refers to the slender filaments. *Physostegia* means "bladder" and "a covering" and is said to have been bestowed on our species from the fact that the calyx becomes somewhat inflated in fruit. The sterile cells of the anthers in *Synandra* cohere, hence the name from words signifying "together" and "anther". The hairy fringe on the

bracts and calyx teeth of *Blephilia* account for its name from a word meaning eyelash.

Genera in the Labiateae dedicated to botanists are not numerous, but we must not overlook *Monarda* which commenorates Nicholas Monardes or Monardus a Spanish botanist who lived in the latter part of the sixteenth century and wrote many pamphlets on useful plants, especially those of the New World. There is also *Collinsonia*, named for Peter Collinson an English botanist of the time of Linnaeus, who did much to make the plants of Eastern America known. J. S. Elsholtz, a German physician of the 17th century is remembered in *Elsholtzia* a genus with certain half-shrubby forms quite unusual among labiates. *Meehania* is the name given to a group set off from *Cedronella* to commemorate the name of Thomas Meehan one of the most acute and learned botanists of recent years. Nor must we forget *Teucrium* which bears the name of that ancient Teucer who legend says was founder and king of Troy. He is reputed to have been the first to use the plants of this genus medicinally. The true mint genus, *Mentha* is dedicated to a wholly mythical personage, *Minthe*, who according to Theophrastus was a nymph which Proserpone turned into a mint plant. *Perilla* is a Greek and Latin proper name.

As usual, there are, in this family, a number of generic names whose derivation is unknown or uncertain. One of these in *Cunila* the name of the dittany. Wood says this is an ancient name for the pennyroyal. The generic name of the black hoarhound, *Ballota*, means according to the same author, "to reject," on account of its vile odor. *Satureia*, the name of the summer savory is said to be the ancient Latin name which Wood says is derived from the *Arabis satur*,

a term used for labiates in general. *Hyssopus* is another ancient name which is said to be derived from the Hebrew *ezeb*. From the same language comes *Marrubium* from *marrob* "a bitter juice". The name was first used by Pliny. The catnip genus, *Nepeta*, is by some said to be derived from Nepet or Nepete an Etruscan city. *Phlomis* is the old Greek name for some woolly plant. Wood says that the woolly leaves of *Phlomis lychanitis* were anciently used for lamp-wicks, a use which the specific name indicates.

The genus *Glechoma*, by which a section of the catnip genus is sometimes known signifies thyme or pennyroyal in the Greek. Both of the species mentioned have names that refer to their aromatic qualities. *Thymus* is an old word for perfume which is reputed to have been given to our plants because of their use in incense, though Wood says the name is derived from *thymos*, courage, from its invigorating smell. The pennyroyal genus is *Hedeoma* from the Greek *edos*, sweet, and *osma*, smell. Originally this is said to have been the name of the mints. *Ocimum* is another generic name derived from the Greek *osma*.

In so useful a group as the one under discussion, there would naturally be a number of generic names derived from their healing or other properties. One of the most familiar is *Salvia* the name of the sage genus from the Latin *salvare*, to save. Then there is *Lavendula* from *lavare*, to wash, in allusion to the well-nigh universal association of lavender with clean clothes. *Prunella* is a modern spelling of *Brunella* a name given to the self-heal from the German *braunc* meaning quinsy, which this herb was reputed to heal. Linnaeus gave sanction for spelling the name *Prunella*, though whether by design or a typographical error seems uncertain.

When once a mis-spelled word becomes current, however, changing it becomes a weighty matter. Such are the ways of botanists.

The rosemary genus, *Rosmarinus* may be mentioned here to point out another error into which plant students sometimes fall. This plant, though called rosemary, has nothing to do with the Virgin. It is really *ros*, dew and *marinus*, the sea. In the labiates, also is found the genus *Betonica*, probably the original of that word "betony" which is often applied to various other plants of different affiliations. *Calamintha* is literally "beautiful mint" and *Origanum* is "mountain joy" or "mountain ornament." *Clinopodium*, formerly used for some of the plants now placed in the genus *Satureia*, is Greek "bed-foot" because the flowers are like a bed-caster. It is possible that the plant which originally bore the name had some resemblance to the article mentioned but it is difficult to see any resemblance to it in our species.

Although the entire group of labiates are commonly called "mints" only a few of them are mints in the sense of belonging to the genus *Mentha*. Most of the other members of the family, however, are so pervaded by the warm aromatic mint-like flavor that it is most natural to regard them as mints, also. The most distinguished of all the true mints is probably *Mentha spicata*, a rather insignificant plant as appearances go, but one that is celebrated in song and story as an all-important accompaniment of roast lamb and as an indispensable ingredient in a beverage which only a Constitutional amendment could banish from public life. Now, falling on more prosaic days, its principal use is in flavoring chewing-gum. As an ingredient in mint-sauce, it has acquired such names as "lamb's mint", "garden mint", "mackerel mint",

"common mint" and probably, "sage of Bethlehem.". "Our Lady's mint" is doubtless a name testifying to its high repute, since only plants of great excellence were dedicated to the Virgin. The name of "spearmint," by which the plant is most commonly known refers to the spire-like inflorescence. The plant was once known as *Mentha viridis* and from this circumstance the plant is occasionally called "green mint".

Second only in importance to the spearmint, comes *Mentha piperita*, well known from its biting flavor as "peppermint", but also called "lamb's mint" and "brandy mint" from which we assume that it occasionally served in place of its more popular relative. Both *Mentha longifolia* and *M. aquatica* are known as "water mint" and "fish mint", probably for their fondness of water, though all the mints are found in wet places. The first mentioned is also "brook mint." and "horse mint", the latter name doubtless referring to its coarse or less attractive qualities. *Mentha rotundifolia* is also "horse-mint" and "wild mint". The meaning of "apple mint" and "Patagonia mint" applied to this species is not clear, but since practically all our mints are of Old World origin and brought their common names with them when they settled with us, they may have more significance abroad. The only species native to both sides of the ocean is *Mentha arvensis* which is known as "field mint" and "corn mint" for growing in cultivated grounds, as "wild pennyroyal" for its odor, and as "lamb's tongue" for its occasional use in sauces. The variety *Canadensis* is sometimes called "American mint", but rarely on this side of the world. *Mentha citrata* is the "bergamot mint". The true bergamot is a member of the citrus family which the orange and lemon belong and the common name of our plant clearly shows it to be a translation of the specific

one. Both were probably given for the lemon-like odor.

Other plants called bergamots belong to the genus *Monarda*. The species most frequently called "wild bergamot" is *M. fistulosa* but the specific name of *M. citriodora* marks that species as best entitled to the name. Instead, the latter is called "lemon mint" and "lemon monarda" which simply states the same idea in different words. *Monarda fistulosa* is a conspicuous member of our flora, able to endure poor soil, and putting up numerous heads of showy lavender flowers. It is sometimes called "Oswego tea" but this name is understood to be better applied to *Monarda didyma*, a plant with flower-heads very similar in shape but of so vivid a red as to rival those of the imperial cardinal flower. It has received a variety of common names but "bee balm" is the one usually heard. Nearly as common is "Oswego tea" the latter half of the name given because the leaves were sometimes used in infusions, but why this tea is associated with Oswego is a puzzle. Among its other names are "mountain mint", "red balm," "low balm", "fragrant balm" and "Indian plume", the last probably a mere book name. "Horse mint," a title sometimes given to this species is more commonly applied to *M. punctata*. This latter species is also called "rignum" which is manifestly a contraction of *Origanum* a genus to which it is wrongly referred. *Monarda clinopodia* is the "basil balm" though Britton's Manual spells the first word *basal*. The name means royal and belongs properly to the species of *Ocimum*. "Balm" is itself a contraction of balsam.

Several species of *Saturcia* are also called "basil.". The one most frequently so named is *S. vulgaris* which is "wild basil", "field basil" and "stone basil". This species is also called "bed's foot" a translation of *Clinopodium* the generic name once used for certain members of this group. "Dog

mint" may refer to its inferior qualities while "field thyme" and "horse thyme" are doubtless names to distinguish it from the true thyme (*Thymus serpyllum*). *Satureia nepeta* is the "basil thyme", "field balm" and "calaminth" or "calamint". This last term is derived from still another generic name *calamintha* which some of the species have borne in bygone days. It means "beautiful mint". *Satureia acinos* is another "basil" or "basil balm" and also "mother of thyme," and "polly mountain" applied to the true thyme is a distortion or reference to pennyroyal. *Satureia hortensis* is the "summer savory" of our gardens whose aromatic leaves are much used for flavoring soups and dressings.

The name of "mountain mint" applied to *Monarda didyma* suggests a confusion of this plant with *Pycnanthemum Virginianum*. When in leaf, only, the two species are, indeed, very much alike, but in flower no one could mistake them. *Monarda* may often be found in elevated places, especially if wet, but the present species is so plentifully distributed in rough country as to be fairly entitled to be considered the true mountain mint. The looseness with which identical terms are applied to a number of plants when there is only a passing resemblance between them is seen in the present instance when our plant is also called "basil", "pennyroyal", "mountain thyme", and "prairie hyssop." These names are of course, explained in their proper places.

In dry and elevated regions a strong and pungent odor often apprises one of the presence of *Hedeoma pulegioides* commonly known as "pennyroyal". Though so familiar to us by this name, it has really usurped the cognomen of a European species (*Mentha pulegium*) regarded as the true pennyroyal. The specific name seems to have been derived

from *pulex* meaning a flea. From *pulegium* it became *puleium* then *puliall* or *poliol* and finally "pennyroyal". The American plant is naturally known as "mock pennyroyal" and "American pennyroyal." It is also called "squaw-weed" from its use as medicine by the Indians. "Tickseed" probably refers to its use against insects. The oil is a well known defense—if such there be—against mosquitos.

Our only species of thyme is *Thymus serpyllum*. Unlike most other plants it does not derive its common name from the generic name for it was known as *thymus* long before scientific names came into fashion. As we have already noted, the word has some connection with incense, as well it might, considering the plant's aromatic odor. It is also called "creeping thyme", "mother of thyme" and "shepherd's thyme". "Penny mountain" connects it with pennyroyal and "hillwort" possibly refers to its growth in broken country. This is the species to which Shakespeare alludes in:

"I know a bank
Whereon the wild thyme grows."

ADDITIONAL PLANTS NAMES

THE series of articles on "Plant Names and their meanings" now running in this magazine is designed to serve two purposes. In the first place it is desired to put into connected form an explanation of current common names for the benefit of those who have not the time to look up this information for themselves, but in addition it is hoped that the series may bring out further notes and suggestions. That this latter hope is being realized is shown by the responses

from our readers. Scarcely a single number has been issued that did not bring us additional information. Incidentally, it may be said that the articles have attracted considerable attention in many parts of the world and inquiries for them have been received from such remote regions as the Cape of Good Hope, India, China, and Russia.

Several additional names in the Ranunculaceae have come to light since the notes on that family were published. We note that the hepatica is occasionally called "blue anemone", a name that is fairly descriptive. *Myosurus minimus* has the singular name of "blood strange". This seems to be derived from the Latin *stringendo*, to staunch, and thus gives some meaning to the name though it is scarcely appropriate. We also missed another change rung on the columbine, in "culverwort". Culver is an ancient name for dove, just as *columba*, in the Latin, means dove, and *columbina*, dovelike. In Vaughan's seed catalogue *Aquilegia Canadensis* is listed as "Turk's-cap". This may be in allusion to the spurs of the flower though it scarcely deserves to be called a common name. "Akely" is a vernacular name originated in an attempt of the unlettered to pronounce *Aquilegia*. *Clematis ligusticifolia* is reported as "hill clematis" in "American Honey Plants" but the plant is not especially partial to hills. The name of "poor man's rhubarb" ascribed to species of *Thlaspi* appears to be based on the fact that the root of one species may serve on occasion in place of the officinal rhubarb. *Aconitum napellus* is a European species of "monk's hood", commonly planted in gardens. It may be of interest to note here that the curiously shaped flowers have received other names such as "friar's cap" which is much the same as "monk's hood", "soldier's cap", "Turk's-cap", and "helmet flower".

The name "bear's-foot" probably applies to the leaves.

In the Rosaceae, we missed "albespine" an old name for the "white thorn" (*Crataegus coccinea*) which comes from *alba spina* which of course has the same meaning as white thorn. *Crataegus oxyacanthus* is the real hawthorn of Europe which is also called "quick" and "quick-set thorn" from its use in hedges. Other names for the hooked fruits of agrimony are "sticklewort" and "harvest-lice". It seems to be uncertain whether the mulberry was so called because its fruits resemble a blackberry, or the reverse. One thing is certain, the word mulberry is a very old term for the blackberry in England. The fruits of the blackberry were also anciently known as "branke-berries" and "bramble apples." The word "raspberry" appears to have been derived from a wine made of raspberry fruits which was called *raspis* in the 15th and 16th centuries.

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NOTE *and* COMMENT



SUNLIGHT IN HIGH LATITUDES.—At the north pole the plane of the equator coincides with the horizon plane so that on March 21st, or rather a few days earlier owing to the effect of refraction, the sun appears on the horizon and makes a complete circuit of the heavens in twenty four hours without setting. This brings to an end the long winter night of six months duration. From this time until the sun crosses the equator going south in September, it remains continually above the horizon for the observer at the north pole and gradually makes its way upward until it reaches an altitude of $23\frac{1}{2}$ degrees at the beginning of summer in June. It then begins to gradually wend its way downward once more toward the horizon, disappearing beneath it at the beginning of fall for another six months. At latitudes between the north pole and the polar circle the sun appears above the horizon before the beginning of spring and rises and sets daily until it reaches a distance north of the equator equal to the observer's distance from the pole. It then makes a complete circuit of the heavens without setting, touching the horizon at the north point and the phenomenon of the midnight sun can be seen. The sun remains continually above the horizon from that day on, attaining a little higher altitude each day until the beginning of summer. After that its altitude above the horizon begins to decrease. When it has reached the same point as before on its southward journey it rises and sets daily once more until

it is as far south of the equator as the observer is from the north pole when it disappears completely from view below the horizon and the long winter night sets in to last until the sun has passed through the winter solstice and has again reached the same distance south of the equator on its return journey to the north.—*Science Service*.

FLOWERING BAMBOOS.—Readers of the *Botanist* who live in a winter sufficiently mild to permit the cultivation of bamboos in the open air will recall that it is a rare experience to find one in flower. Even in their native haunts many species flower only at long intervals, sometimes as much as thirty years, after which the whole plant dies; and it often happens that cultivated plants never produce any flowers at all. I had the unexpected pleasure this past season of coming upon a bamboo-hedge in full flower. The species, a very common one in cultivation here, introduced from Japan, is *Phyllostachys mitis*, belonging to a genus easily recognized by the fact that the internodes of the culm are flattened on one side. This species is perfectly hardy in our climate, but no flowers had ever been reported until a hedge in front of the State School for the Deaf suddenly in late August burst into bloom, the panicles in many cases being as much as two feet in length. This will doubtless end the career of that particular hedge; but the plant is easily propagated by root-cuttings. It would be interesting to know the experiences of other readers with flowering of this or any other species. Mrs. Agnes Chase tells me that though this *Phyllostachys* has been known in cultivation about Washington, D. C. for some fifteen years, it has never been known to flower.—*J. C. Nelson, Salem, Oregon.*

PLANT OR ANIMAL LOCUSTS?—Rev. George L. Tilton questions the statement, in a recent number, that the food of

John the Baptist in the wilderness was the fruit of the Carob tree. He writes: "If Matthew meant his readers to understand that John fed on carob pods I hardly think he would have written locusts; especially as certain species of locusts were a common article of food among the Bedawin Arabs and the very poor of the country generally. If you have not read the statement of Dr. Wm. Thompson forty years missionary in Syria, you may be interested in a quotation from his classic work, *The Land and the Book*, Vol. 2 pp. 107-8. "Do you suppose that the meat of John the Baptist was literally locusts and wild honey? Why not? By the Arabs they are eaten to this day. The perfectly trustworthy Burchhardt [who identified himself with the Arabs in his whole manner of living] thus speaks on this subject:—"All the Bedawins or Arabia are accustomed to eat locusts. I have seen at Tayf and Medina locust shops where these animals were sold by measure. The Arabs in preparing locusts as an article of food, throw them alive into boiling water with which a good deal of salt has been mixed. After a few minutes they are taken out and dried in the sun; the head, feet and wings are then torn off; the bodies are cleansed of the salt and perfectly dried, after which process whole sacks are filled with them by the Bedawin. They are sometimes eaten boiled in butter, and they often contribute materials for breakfast when spread over unleavened bread mixed with butter." Thus far Burckhardt. Then Dr. Thompson after stating that locusts were eaten only by the Bedawin and the very poorest people goes on to say, 'John the Baptist, however, was of this class either from necessity or election. He also dwelt in the desert where such food was and is still used, and therefore the text states the simple truth'. Were I trying merely to prove this point

I could easily add other authorities but I hardly suppose you seriously doubt it".

PUCCOON AND MARSH ELDER.—Regarding the inquiry as to the significance of the word pucooon, Mrs. M. E. Soth writes: "I believe it is the Indian word for any plant from the root of which a reddish dye may be obtained as the *Lithospermum* and also the bloodroot; also the pigment itself. The books give "marsh elder" as the common name of *Iva xanthifolia* but I never heard it called that. We always called it "horse-weed" in Iowa because it was so lusty and abundant in places where horses were wont to be found. We youngsters called it "spear-weed" because its shining leafless trunks made such light, straight, shooting darts after frost shriyelled the leaves. It is interesting to note that it diminishes in size as it travels westward. In Colorado it is only half as high as eastward. Here in Idaho it is scarcely a yard high, a mere relic of its glorious condition in the East.

WOODLESS LUMBER.—According to *Science Service* a board twelve feet wide and nine hundred feet long has recently been produced. This is a much larger board than could be produced from any tree that we know of. It is said to contain sufficient material to construct three five-room bungalows. This remarkable board was made from sugarcane, or rather from the refuse, of the cane after the sugar has been extracted. Sugar-cane refuse, known as bagasse, consists of the fibrous material of the plant and is very similar to the fiber from which paper is made. In making bagasse lumber the fiber is put through processes similar to those employed in making paper. The new lumber is said to be very light, waterproof and an excellent non-conductor of heat. Up to the present, refuse sugar cane has been of little use and is

usually burned to get rid of it. Now that a way to use it has been found, it is expected that the cane fields of Louisiana, alone, will yield over 750,000,000 feet of this lumber annually. There are many demands for wood that the new material will not supply, but it can be used in so many ways that it seems destined to take much of the pressure from our rapidly diminishing forests.

RIPENING GRAPE-FRUIT.—Investigation proves that there are more differences in grape-fruits than are shown by size and color, though these latter, especially color, may indicate other differences when interpreted correctly. Everybody knows the difference that exists between green and ripe bananas. Green bananas are practically all starch but if left until the skins are yellow or nearly black these same fruits will become sweet and palatable. The fact is that bananas are alive and if given time will digest their starch and tannin into sugar. Not until this process is finished are the fruits actually ripe. Many people fail to realize that other fruits run through the same series of changes. In the case of the grape-fruit it has been found that when the fruits are held in cold storage for a period of from one to three months they develop a superior flavor. Much of the acid disappears and with it the bitter principle, while the sugar content increases. It is apparently another case of digestion improving the flavor. It has been supposed that the increase of flavor depends in some way upon cold storage, but this is probably incorrect. The length of the time the fruit is kept seems to be the important factor, for ones notices a remarkable difference in the flavor of grape-fruits that have not been in cold storage at all. In selecting these fruits, therefore, it is well to pay some attention to the color of the fruit and to select those which are fully ma-

tured and deep colored. Even slightly shrivelled fruits may prove desirable.

CHAULMOOGRA OIL.—A considerable stir has recently been made in the public prints regarding the virtues of chaulmoogra oil in the cure of leprosy. One might infer from this that the idea is new, but this proves not to be the case. As early as 1881, Dr. John D. Hill suggested this use of the oil in the "New York Medical Abstracts." The oil and its use is also mentioned in the "U. S. Dispensatory", edition of 1888.

MILKWEED TRAPS.—The *Asclepias'* method of pollination does not seem very effective to me. In one umbel I counted ninety-four flowers each of which possessed two embryo pods yet rarely as many as five in the whole cluster develop. Does the plant need all of those fragrant blossoms to coax insects to help her make one or two grow into fruits? Nature is lavish again when she does make a pod for in one I counted two hundred and twenty-five seeds, each with its own pretty white sail. One June day I watched an ant struggling desperately on one of these blossoms. The middle and hind legs were all entrapped in the slits between the upstanding, enticingly sweet, hoods. The poor ant had no thought about the sweetness, being too busy trying to free itself. It would pull and twist and sometimes a leg would slip out but with the next movement it would slip in again. I wanted to help and held my middle finger for it to cling to. Then the middle legs came out and one of them bore a pair of yellow pollen masses. A moment later the two other legs were freed. The insect was in a great hurry and it was difficult to keep it crawling on my hands and arms until I discovered pollen bags on one of the hind legs too. It seemed excited and bothered with the sticky appendages. I wished it could fly for it re-

minded me of a cat with its feet tied up in papers. Milkweed traps do not please me when I find three honey-bees hanging stiff and dead from the veritable death-traps which the blossoms sometimes become.—*Nell McMurray, Clearfield, Pa.*

KINGHEADS.—With regard to Prof. Nelson's inquiries about the names of *Ambrosia trifida* and *Iva xanthiifolia*. The name kinghead is in common use for the former in our region. I do not know any name in general use for the latter except that the inappropriate name marsh elder is much used. I have suggested for it the name false kinghead on account of its general resemblance to the other plant. A group of them around deserted homesteads truly does suggest a group of trees when seen at a distance.—*O. A. Stevens, Agricultural College, N. D.* Professor E. A. Bessey in a note to Prof. Nelson reports that *Iva* is known as "marsh elder" in the upper Peninsula of Michigan.

TWO NEW GARDEN PESTS.—It has often been questioned whether cotton or corn was king of agricultural products and the decision may have to be held in suspense for some time while we combat the enemies of both claimants to the throne. It is doubtless only another indication of the general decline of the king business that both crops are seriously threatened. Cotton is in danger from two kinds of boll-worms, both of which are steadily increasing in their invasion, while corn has the corn-ear worm and the cornstalk borer to contend with. The corn-ear worm has been spreading in the corn belt for many years. It is to all intents and purposes a cut-worm which eats its way into the growing ear of corn and defiles much that it does not consume. There are three broods in a season and more than enough of the repulsive worms to go around. Those that cannot find an ear of corn in which to

burrow attack tomatoes, peppers, beans, and other garden produce. The cornstalk borer is a more recent introduction. It comes from abroad and does great damage, not only to corn and broom-corn but to celery, beets, spinach, rhubarb, asters, cosmos, zinnia, hollyhock, gladiolus, dahlia and other plants. It was first noticed a few years ago in New Jersey but it failed to heed the quarantine regulations of our celebrated Federal Horticultural Board and has steadily spread westward. It has progressed as far as Ohio and it is now proposed to establish a new quarantine by prohibiting or restricting the movement of the plants mentioned above, across a line from Lake Michigan to the Ohio Valley. This may help some, but it ought to be clear to everybody by this time that a quarantine often does not quarantine. One lively entomologist in the field devising methods for controlling the pests is worth several reams of restrictions put out from Washington by the Government scientists.



EDITORIAL



A great many things depend upon the point of view. A cathedral may be seen through a keyhole or we may attempt to view it from a point so near that we see only the stones and mortar just beyond our noses. The idea is well illustrated in the matter of botanical nomenclature. The philosophical botanist views the rules for naming plants in their entirety and perceives that they are merely a means to an end and that end the distinguishing of one species from another; but the technical botanist is frequently too near his subject and fails to see it in proper perspective. He is fond of quarreling over different "codes" of nomenclature and he often uses up much good white paper in attempting to establish the priority of a favorite name which he has exhumed from some ancient and musty tome, or in trying to prove which of two dilapidated specimens is entitled to bear the name given by a botanist long since turned to dust. More reprehensible still is his worship of the author citation. The philosopher realizes that the author of a plant name must frequently be cited to indicate the exact species meant, but the pettifogging botanist too often considers such citations as a means of gaining distinction for himself. He is frequently charged with changing names without sufficient reason when this will bring his own name into prominence. If this stricture is unjust, how else can we explain the fact that every albino flower and fruit and every variation from the normal in other plant parts is dignified by a name which includes the name of the author? To be sure all

important variations should have a name in order that they may be conveniently designated, but why the author citation? Does the namer of a white huckleberry or white cardinal flower fear we shall not know that it is white unless it is accompanied by the name of the eminent describer? In the older books this is not so, for nearly everybody realizes that albinos are likely to occur occasionally in any group of living things. The nonsense, moreover, does not stop here. It frequently happens at present, that if one author describes a specimen as a variety, another will at once call it a form or vice versa. This proceeding enable the name-changer to make a "new combination" and thus inject his own unmusical patronymic into the citation. But who, it may be asked, can distinguish surely between a variety and a form? The lines that separate one specimen from another are not hard and fast. There are variations of all degrees of importance, seasonal, edaphic, geographical, physiological and what not, and nobody can really say where one ends and the other begins, unless it be the name-tinker standing too close to his cathedral. If we could only get him to stand a little farther back, what an immense number of trifling problems that now perplex his mentality would automatically disappear!

* * *

We have received notice that a third society for protecting the wildflowers has been organized. The newcomer appears under the joint auspices of the Massachusetts Horticultural Society and the Garden Club of America. That we can never have too many people interested in protecting the wildflowers is certain, but it may be questioned whether the results desired could not be better attained by uniting the efforts of all concerned into one strong movement. The great

criticism that can be made of most of the proposals for protecting plants thus far offered, is that they are based too largely on sentiment. Undoubtedly a very praiseworthy sentiment is at the bottom of all suggestions for protecting the flowers but it would seem that protection, itself, should be of more practical nature to be effective. We should at once locate all areas in which plants may be protected without conflicting with other uses of the ground—parks, cemeteries, large estates, woodlands, marshes, bogs, dunes, cliffs, river banks, lake shores, and railroad rights of way—and see that they are properly protected. And we are of the opinion that one stern sign to the effect that flower-gathers will be prosecuted is worth a hundred requests to “please do not pick the pretty flowers”.

Perhaps the herb everlasting, the fragrant immortelle of our autumn fields has the most suggestive odor to me of all those that set me dreaming. I can hardly describe the strange thoughts and emotions that come to me as I inhale the aroma of its pale, dry, rustling flowers. A something it has a sepulchral spicery, as if it had been brought from the core of some great pyramid, where it has lain on the breast of a mummied Pharaoh. Some too, of immortality in the sad, faint sweetness lingering so long in its lifeless petals. Yet this does not tell me why it fills my eyes with tears and carries me in blissful thought to the banks of Asphodel that border the River of Life.—OLIVER WENDELL HOLMES.





DEATH CAMAS.—*Zygadenus venenosus*

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*I would not say that trees at all
Were of our blood and race,
Yet, lingering where their shadows fall
I sometimes think I trace
A kinship, whose far reaching root
Grew when the world began,
And made them best of all things mute
To be the friends of man.*

—Samuel Valentine Cole.

THE DEATH CAMAS

By LESLIE L. HASKIN

ZYGADENUS *venenosus* commonly known as death camas bears an evil reputation with reference to both man and beast on the Pacific Coast. Its danger to human beings comes from its resemblance to the true edible camas (*Quamashia*), of the same region. The Indians recognized its dangerous nature and used great caution to protect themselves from possible poison. To them it was an especial menace since it grows in the identical situations favored by the true camus, which was, and is, one of their principal food plants. Both grow in moist meadows and swales, often closely intermingled. Their bulbs, too, so nearly resemble each other that it is not safe to attempt to distinguish them when severed from the leaves and flower scapes.

It is true that the bulb of the *Zygadenus* never seems to attain to quite the size of a well developed *Quamashia* bulb but

as in every camas patch there are many small seedling bulbs, size alone is no safe criterion. As long as the fruiting capsules remain upon the plant, however, they are easy to distinguish. The capsules of the death camas are much smaller and more closely set upon the stem, and the scapes are more slender. The leaves, too, are narrower, and usually folded lengthwise, while those of the true camas remain flat. In spite of the Indian's knowledge of the dangers of the plant, cases of poisoning often fatal, seem not to have been uncommon among them. In Indian medicine, according to Chestnut, the bulbs are used as a poultice for boils, and for bruises and sprains, and are also applied as a cure for rheumatism.

Although the use of camas for food has never become general among the white inhabitants of this section, many people, as a novelty, enjoy digging and eating the bulbs in a raw state, and children are sometimes poisoned through failing to distinguish these from the bulbs of the death camas.

The bloom of the death camas is very attractive, being white with each section of the perianth bearing a yellow gland at the base. The many-flowered scapes rise to a height of from six inches to two feet, much exceeding the narrow inconspicuous leaves. In the Willamette Valley the blossoms appear about the middle of June, and are rather short lived.

Horses and cattle are sometimes made sick from eating death camas, but seldom with fatal results. By far the greatest loss from this plant occurs among bands of sheep. According to Mr. Lawrence, of the Oregon Agricultural College, the fatalities to sheep sometimes reach as high as "twenty-one per cent in a band" in regions where the plant is common. In the same connection he states that all parts of the plant are dangerous, but are "poisonous in the following order, beginning with the most toxic: seeds, mature pods, flowers,

leaves, bulbs, roots, young pods." Hogs seem not to be affected by the poison of this plant. On the other hand they appear to relish it, which has given it among other common names that of hog's potato. Other names locally applied to the plant are lobelia, poison grass, poison sego, alkali grass, water lily, wild onion, and soap root.

FLOWERING PLANTS IN MASSES

By R. M. CROCKET

IT is most interesting to note, as one journeys through the country, how lavishly flowering plants that are either small or not particularly striking in the individual are massed so as to present a bold effect. In a pasture between Hartford and Manchester, Connecticut, there appears with the first breath of spring, a wonderful display of pearly whiteness that might seem to be snow or hoar frost to the tired commuter as he whizzes by on the trolley. Closer examination, however, discloses the fact that the effect is produced by the unassuming pussy-toes (*Antennaria dioica*) with its fuzzy little edelweiss like flower-heads three or four inches above its tufts of woolly leaves.

Following this initial display, in the same pasture, with hardly an interval between comes a vision of the daintiest loveliness in lilac-lavender shades. Our friends the bluets (*Houstonia caerulea*) are blooming. Day after day they persistently present fresh faces to the sky and *en masse* maintain an apparently unchanging sheet of blue. A careless cow may obliterate with its hoof a score of the delicate things yet, until the grass around them has grown tall enough to obscure their beauty, the picture at a distance is perfect.

After the bluets are hidden by the grass and other plants,

a more robust denizen of the field raises its head. Here again are masses of light blue waving in the gentle breeze. This is no other than robin's plantain (*Erigeron bellidifolius*) growing in multitudes, doing its part, both singly and collectively, to continue the panorama started by the pussy-toes.

I have often wondered if it was to attract, by sheer prodigality of numbers, the various insects necessary for pollination that so many of the small-flowered annual and perennial plants grow in such huge patches, seemingly taking possession of the entire area for the short time comprising their span of life. Other examples of this liberal painting of the landscape with one predominating shade at a time that might be mentioned are the blue-eyed grass and the orange colored krigia.

In a meadow along Riverside Drive, Redbank, New Jersey, the blue-eyed grass (*Sisyrinchium bermudianum*) grows in great profusion. From the road it looks as though a giant had drawn a blue pencil across the meadow. Not being able at a distance to determine the cause of the blue streak I became curious to find out. What a pleasant surprise awaited me! Never before had I seen blue-eyed grasses in such profusion, and except for quantities of chicory (*Cichorium intybus*) which flourish on waste lands around Boston, I have not seen such beautiful flowers in mass formation before.

Around Cranford, New Jersey, the orange-colored krigia (*Krigia amplexicaulis*) has taken possession of the damp meadows in the vicinity of the Rahway river. Individually the flowers might pass for small dandelions though they have wiry stems, but in colonies they warm up the whole landscape with their rich orange tints that are renewed daily to the delight of the beholder. Later in the season, on the same area, the purple gerardia held sway. In this case the individual

blossoms are as fascinating at close range as they are viewed at a distance in tens of thousands.

One could add many more instances of this disposition of nature to scatter freely certain subjects of her kingdom where they will luxuriate while other plants of greater individual beauty and vigor are sparingly distributed. No doubt many plants have multiplied more freely as exotics than they ever did in their native haunts and have had that disdainful appellation "weed" imposed upon them.

PLANT NAMES AND THEIR MEANINGS—XIII

LABIATAE—II

By WILLARD N. CLUTE

NUMEROUS species of the Labiateae are called "balm", as we have seen, but the one which by common consent bears the title is *Melissa officinalis*. The specific name further confirms the title; at least it shows that it is the plant once sold in the shops as balm. The plant is also known as "lemon balm", "balm mint", and "bee balm", but since the generic name means bee, the latter is something of a pleonasm. "Honey plant" and "dropsy wort" are of obvious derivation and "sweet Mary" refers to its odor. "Goose tongue" and "pimentary" are old names of no particular meaning, though since *piment* was an ancient term for wine flavored with spices it may have derived the latter name from its use in such beverages.

Strangely enough the true mountain mint, to judge from the significance of its generic name, *Origanum*, seems never to be called by that title. The best known species, *O. vulgare* is known as "wild marjoram" and "pot marjoram," both terms derived from *majorana* by which name a European species has been called for more than a thousand years. "Origanum" and "organs" are easily seen to be contractions of *Origanum* while "winter sweet" refers to its odor.

There are a number of "false pennyroyals" among the Labiates. One of these is *Isanthus brachiatus* and another is *Trichostema dichotomum*. The latter is more commonly called "blue curls". An allied species, *T. lanceolatum* shares the name of "false pennyroyal" and is also known as "flea weed", both names carried over from the true pennyroyal. This latter species is also "vinegar-weed", "camphor-weed" and "turpentine," names which, we infer, have reference to the odor, but this is only a conjecture.

First among medicinal labiates should come the garden sage (*Salvia officinalis*) if names count for anything, for from the generic name is derived the common name "sage" and to it are related such words as solid, safe, solemn, and salvation. *Salvia lyrata* is the "cancer-weed" though utterly belying any reputation for curative properties. Another species, *Salvia sclarea*, is called "clary", "clear-eye" and "see-bright" because its mucilaginous seeds were used to clear the eyes of foreign matters as we now use the seeds of flax. *Salvia verbenacea* is also "wild clary" and "eye-seed." The "wood sages" are species of *Teucrium*. Our commonest species, *Teucrium Canadense*, is commonly known as "germander". This name the authorities would have us believe, is derived from the specific name of the European germander, *Teucrium chamaedrys*. It may seem incredible that the common tongue could

have made "germander" from *chamaedrys* but stranger mistakes than this have been made by the unlettered. *Teucrium scorodonia* is the "germander sage". A species of another genus, *Phlomis tuberosa*, is the "Jerusalem sage" and "sage-leaf mullein," the latter name given in reference to its woolly leaves.

Second only to sage, or possibly before it, as a healing herb is *Prunella vulgaris*. The genus is named from the German *braune* a disease of the throat (quinsy) for which it was once regarded as specific. Its reputed curative powers were even of wider application for the plant is also known as "heal all", "self heal", and "all heal". It was regarded as especially good for cuts as we find hinted at in "Sicklewort", "hook heal", "hook weed", and "carpenter's herb." "Square stem" is a name which must have been given to the plant by someone who failed to observe that most mint stems are square. "Carpenter's square" has no reference to that artizan's best known implement but is another reference to the shape of the stem. "Brown wort" (from *braune*), of course refers to its use in the cure of quinsy. "Heart-of-the-earth," sometimes applied to this plant, is said to be given it because it uses up the soil, but to me it seems more likely that it alludes to the plant's many virtues, whose excellence these more degenerate modern days utterly fail to substantiate. "Blue curls" refers to the flowers and is probably the commonest common name of the plant at present in spite of the fact that *Trichostemma* also bears it. "Blue Lucy" is another name referring to the color of the flowers. "Dragon head" appears to be a fanciful name and "thimble flower" a meaningless one, though by a great stretch of the imagination one might fancy the spike of seed pods to resemble a thimble.

Still another group of reputed vulnerary plants are the

species of *Stachys*. The most familiar is *Stachys palustris* which is known as "all-heal", "clown's-heal", "clown's woundwort", and "marsh woundwort". The name "rough-weed" refers to the foliage while "hedge-nettle" is probably inspired by a fancied likeness to the real nettle, though another name "dead nettle" indicates that the difference is perceived. *Stachys hyssopifolia* is the "hyssop hedge nettle". *Stachys arvensis* is the "corn woundwort", or "field woundwort" from its habit of growing in cultivated areas.

There are still other dead nettles among which may be noted the "hemp dead nettle" (*Galeopsis tetrahit*). This plant is also known as "bee nettle", "dog nettle", "blind nettle", "flowering nettle", "nettle hemp", and "false hemp". Nearly all of these terms illustrate the tendency of the common people to group plants of similar appearance together. The adjectives false, dead, and blind, however, show very clearly that they have not been deceived by appearances but have distinguished the plants to which they are applied from the true stinging nettles (*Urtica*) and other less harmful kinds. "Flowering nettle" is a pardonable mistake, for the flowers of the true nettles have little resemblance to what are ordinarily regarded as flowers. The definition of such terms as flower and weed of course depends somewhat upon who is doing the describing. *Galeopsis ladanum* is the "red hemp nettle" and "dog nettle". This and the preceding species are also known as "ironwort", for what reason I do not know.

The list of dead nettles is not complete without three species belonging to the genus *Lamium*. Upon *Lamium album* have been piled "white dead nettle", "dog nettle", "blind nettle", "dumb nettle", and "bee nettle", besides "snake flower", "suck-bottle" and "white archangel". It is very apparent that a nettle that cannot sting is in common parlance, either

false, deaf, dumb, blind or dead. The term "archangel" applied to this plant has been given to several others in reference to their size or beneficial qualities. The true "archangel", at least on the authority of the scientific name, is *Archangelica* a genus of Umbellifers allied to the carrot and celery. The species of this genus have an aromatic odor and it is possible that our plants may have been named with reference to this quality; certainly they are quite unlike it in appearance. *Lamium amplexicaule* has been named the "henbit" or "henbit dead nettle". "Henbit", according to the dictionary is a morsel for hens but how it applies to this species is a mystery. *Lamium purpureum* is the "red dead nettle", and "sweet archangel". Old names for it are "dog nettle", "French nettle" and "deaf nettle." The name "rabbit meat" doubtless refers to the idea that rabbits eat the plant.

The list of plants called mints has not been used up with the species already mentioned. There is still the "stone-mint" or "sweet horse-mint", by which our only species of *Cunila* is known. Its more familiar title is "dittany" which is itself said to be derived from *Dictamus* the name of a European plant so named because it was abundant upon Mt. Dicte in Crete. The true "dittany" is regarded as being *Dictamus fraxinella*. Our plant is another of the "basils". Still other mints are the "wood mint", by which name *Blephilia hirsuta* is known and "Ohio horsemint", the common name of an allied species, *B. ciliata*. Nor have we yet listed the familiar "catmint" (*Nepeta cataria*) beloved of cats, and whose leaves are made a soothing tea for babies and irritable adults. It is also known as "catnep" or "catnip" the latter title being the more familiar. From the fondness of cats for it, the plant was known as "cat's heal-all". *Agastache nepetoides*, which, as the specific name indicates, resembles the better known

plant is also called "catnip" but it is better known as "giant hyssop".

The peculiarly appropriate name of "obedient plant" is applied to *Physostegia Virginiana*, a tall plant with showy magenta flowers borne in terminal spikes. The individual flower-stalks are so constructed that when a blossom is pushed to the right or left it will retain the position until pushed in another direction thus accounting for the name. "American heather" is an attractive book name that might well have a wider circulation. The clustered flowers are not so very unlike those of the true heather (*Erica*). "False dragon-head" and "lion's heart" given this plant are general names that more properly belong to the species of *Dracocephalum* among which our species is sometimes included. *Dracocephalum parviflorum* is the plant most commonly regarded as the true "dragon-head" or "lion heart". Both names appear to be mere fanciful appellations, though "dragon head" is a literal translation of the generic name which was given for some supposed resemblance of the flowers to a dragon.

The name of "lion's tail" belongs to another mint, *Leonurus cardiaca* which is more commonly known as "motherwort" from its reputed value in cough mixtures. It is also known as "lion's ears" but those who call it so have directed attention to the wrong end of the animal. The generic name is surely translated "lion's tail". The specific name, *cardiaca*, however, has reference to the heart and we might hastily conclude this to be the true lion's heart, if it were not practically certain that the specific name is connected with the plant's reputed power as a heart tonic. "Cowthwort" is a meaningless old English name. *Leonurus marrubiastrum* is the "horehound motherwort", but the true "horehound", which this resembles, is *Marrubium vulgare*. The latter plant is also

known as "white horehound", "hound's bane", "marrube" and "marvel". The word "horehound" is said to be derived from *hoar*, white, and *hune*, plant, and to have no reference to dogs. It should therefore be spelled hoarhound, but the modern way of spelling it is the one I have used. *Ballota nigra* is the "black horehound", "fetid horehound", "hair hound", "false horehound", "black angelica" and "henbit". All are intelligible and the last two indicate a mental association of these plants with *Lamium*. Another plant often wrongly named "horehound" is *Lycopus Europaeus* which is usually better known as "water horehound" or "marsh horehound". This is also the "green archangel" and "gypsy plant" or "gypsy weed". The last two names allude to the belief that this plant is used by gypsies to stain the skin. *Lycopus rubellus* and *L. Americanum* are other species that are known as "water horehound" and "gypsy wort", and the latter shares the name of "bitter bugle" with *L. Europaeus*. *Lycopus Virginicus* is known as "bugle weed", "bugle wort" or "wood betony". The last name results from a confusion of this species with the real wood betony (*Betonica*). The species of *Ajuga* are also commonly known as "bugle weeds", from a fancied resemblance to the well known musical instrument. "Bugle", it may be said, is derived from *buculus* a diminutive of *bos*, an ox, and the reference is of course to the horns. *Ajuga reptans* is the species most commonly called "bugle-weed" or simply "bugle". It is occasionally known as "carpenter's herb" and "sickle wort", names which are apparently due to the confusion of this species with *Prunella*.

The species of *Scutellaria* are generally called "skull-caps" from the appearance of the fruiting calyx like a helmet with visor closed. *Scutellaria lateriflora* is the "mad-dog skull cap" and "madweed" because it was once reputed to be

a cure for rabies. "Hood-wort" is another reference to the calyx and "blue skull-cap" and "blue pimpernel" refer to the color of the flowers though the pimpernel is a very different plant. *Scutellaria galericulata* is the "marsh skull-cap" and "hooded willow-herb". It may be added that its form does not in the least resemble either the willow or the willow-herb.

In rich woods in early summer, one may find the broad leaves of *Collinsonia Canadensis* surmounted by its panicle of yellowish lemon-scented, flowers. The knotty root, or rather rootstock, is a marvel of hardness and gives the plant such names as "knot-root", "knot-grass", "knob-weed", and "stone-root". "Horse-balm" and "ox-balm" allude to its superior size and "citronella" to its scented flowers. The name of "richweed" and "rich leaf" probably refer to its place of growth.

Early in spring one often finds the earth in waste places covered with a tangle of roundish leaves through which peep great numbers of cheerful though small, blue flowers. This is *Glechoma hederacea* a lowly relative of the catnip and commonly called "ground-ivy" as the specific name suggests. It is abundant on both sides of the Atlantic and has a host of common names most of which are of obvious significance as "gill-over-the-ground", "gill-go-by-the-ground", "gill-run-over", "creeping Charley", "creeping Jenny", "wild snake-root" and "robin-runaway." The terms "ale-hoof", "tun-hoof", "hay-hoof" and "hove" may have been derived, as often suggested, from the Anglo-Saxon *hufa*, a crown, because garlands for country inns were made of it, but there is also a possibility that the name was originally "hai-hove" meaning "hedge-ivy" since still other names for it are "hedge-maids" and "hay-maids". "Ale-hoof" may also be a corruption of ale *heave* and refer to the use of this plant in making the ale "heave" or

"work". Darlington, in his "American Weeds and Useful Plants" says that this species was used as late as the time of Henry VIII of England to clarify and flavor the ale. An infusion of the plant with ale was known as "ale-gill". Such are some of the perplexities that confront the investigator when he attempts to unravel the meanings in the vernacular names of plants.

SELECTING SUPERIOR VARIETIES

By F. W. VONOVEN

OUR knowledge of the great outdoors, Nature's arboretum, is not complete until the botanist can tell us of all the kinds and varieties and where to find them. To ascertain the members of the indigenous flora of any community is quite a problem in itself and the reporting of such matters is a practical scientific outlet for those botanists who scour their territories from year to year. In these journeys they are bound to notice special trees or other plants noteworthy for their foliage, color, shape, vigor, age or size.

Hawthorn trees and their hybrids may be investigated as to the ornamental value of their foliage or shape, the earliness of their flowers or fruits, size of fruits, single and doubleness of flowers, and other features which determine the superiority of one tree over another. The planting of a thousand acorns or a thousand seeds of elms will never bring a similar number of trees with the vigor, foliage, shape, and other characters of the parent species. There is great variation in the seedlings and only the best should be selected.

Botanists should not only know the names of the typical indigenous trees and shrubs but should be informed as to the location of such superior types as occur. A nurseryman or horticulturist naturally becomes more or less a botanist through close inspection of the varieties which he has under observation in his plant collections from year to year and thus numerous desirable varieties are originated. The Hollanders and other foreign plant growers selecting the stronger strains of plants from their seedlings have thus turned out many of the fine varieties that are the basis of our horticulture today.

Has it ever come to your mind that there are many beautiful perennial plants growing wild in our country that if put under cultivation would themselves be of value and if hybridized might become the parents of other worthy garden varieties? Have you ever reflected that only the most hardy and vigorous plants of a species or variety should be the basis of propagation? Why then, waste hundreds of years of effort by planting the inferior varieties? Those who can assist in locating the specimen trees, shrubs and other plants from which seed or propagating stock may be had would be doing a great favor for horticulture by reporting them. It may take several years of comparison in a given locality to determine the value of some varieties which seem to have superior qualifications, but you will be doing a good work for horticulture and possibly you may find some varieties that have not as yet been named.

BOTANY FOR BEGINNERS—VI

By WILLARD N. CLUTE

IT is probably a fortunate thing, considering man's ideas of beauty, that Nature did not make all plants alike. No doubt a world might have been created with nothing on it but grass, or ferns, or pines from pole to pole, but we have been spared such monotony. On our better ordered planet, there are not far from one hundred and twenty-five thousand flowering plants, to say nothing of nearly as many mushrooms, ferns, puffballs, mosses, seaweeds, and similar plants that never produce either flowers or seeds. To be sure the existence of such names as rose moss, flowering fern, asparagus fern and sea lettuce seem to indicate that these latter plants may flower on occasion, but in every case the names are founded on a misapprehension.

If we ask ourselves why there should be nearly two hundred and fifty thousand kinds of plants in the world, the most satisfying answer is, that since there are mountains and deserts and plains, swamps and bogs and ponds, lowlands and elevated regions, temperate, torrid, and frigid zones, and many combinations of these, vegetation has had to adopt a great variety of forms in order to fit into the different situations presented.

There are, of course, a large number of people who still hold to the opinion that plants have existed in the forms they now exhibit, since the very beginning, but it seems more reasonable to suppose that during the millions of years that

plants have inhabited this unstable and changing earth, a certain amount of change must have occurred in them also. Everybody must be aware that no two objects in nature are exactly alike. There is indeed, more or less variations in plants of the same kind and the plant breeder has taken advantage of this to produce a long line of improved varieties of garden vegetables, flowers and fruits.

Left to themselves, plants must have worked out some similar methods of improvements, for given the power, which all flowering plants possess, of producing seeds far in excess of the number necessary to replace those annually lost by death, there is certain to be an over-production of young plants and consequently great competition for every square foot of available space. Only those plants whose natural variations give them some advantage over the others could possibly hold their own under such circumstances. The less nicely adjusted to the locality would naturally perish and leave no sign. In fact we may see this very struggle going on in our own gardens and waste lands every growing season. Millions of young plants spring up, only to be ruthlessly smothered out in their infancy by a few stronger and thriftier individuals who have the ability to take and the power to hold. Thus does Nature play into the hands of the more efficient individuals.

Considering these facts, one perceives that the resemblances he notices among plants are not mere accidents. Here, as elsewhere among living things, resemblance denoted relationship. The different forms have descended from a common ancestor and those which most closely resemble one another are most closely related. As in human families, plant children resemble their parents, first cousins may have many family traits in common and these traits somewhat dimmed by distance may appear in second cousins and others more re-

mately related. Such resemblances, indeed, are recognized by the non-botanical. Give a man an unfamiliar plant and he at once attempts to classify it. He says "It looks like a lily," "like a rose", or "like a grass" as the case may be. The botanist with more knowledge upon which to base his conclusions is more certain of the relationship and uses this information to arrange the plants of the world in related groups. All the plants of one kind he groups as a *species*. It is not hard to recognize the members of a species for the essential thing about them is that they are practically alike. Nor is it much more difficult to recognize closely related species because of their general family resemblance. For instance, the red clover, the white clover, and the crimson clover would be recognized at sight as members of the clover group. To a group of closely related species of this kind, the botanist gives the name of *genus*. In this way the scientific names of plants originate. They are simply the names of the genus and species to which a given plant belongs.

There are, of course, cases in which the family likeness is not at all conspicuous and then even the botanist may be puzzled. Plants of this kind are joys to the name-tinkers who are wont to debate with much gravity whether some slight difference in form is sufficient to warrant the setting up of a new species. It may be said that those who are constantly engaged in hairsplitting studies may perceive differences not apparent to the casual observer, just as when one goes into a foreign country, the people at first look pretty much alike but eventually their individual peculiarities appear. In consequence, the herbarium student often makes species that the field botanist distinguished with difficulty if at all. It used to be said in Washington, when the craze for making violet species was at its height, that before a violet could be properly identified,

one must not only know when and where it was collected, but who collected it!

When species closely resemble one another, it requires, of course, very nice distinctions to determine their position in the plant world. One then realizes the truth of the dictum that "species are but judgments" and can appreciate some of the difficulties of the strict scientist. A fertile subject for discussion is whether similar plants of the Old World and the New belong to the same species. In the northern part of both Hemispheres, there are numerous plants that appear to be identical but that are not always called so, and the difficulty of judging them properly is increased by the fact that the material used for comparison is usually in a dried condition. One who has worked in an herbarium knows that the closet botanist may become so accustomed to dried plants as to fail to recognize their living representatives. It is said that when an eminent New England botanist found it hard to name a plant fresh from the field, he used to say to his followers "Let us dry it and then see how it looks!"

But unless one is making a dead set at nomenclature and taxonomy, the vagaries of the technical botanist need give him no concern. The fields and woods are full of flowers that are quite recognizable and easily named. To find them year after year, springing from the selfsame nooks and punctual to their time of blooming, almost to a day, is a pleasure that the strict scientist, engaged with dry facts, often misses entirely, but one that is never denied children, poets, and all good botanizers.

IMPORTANT MOVEMENTS OF PLANTS—III

By JOHN J. BIRCH

GEOTROPISM AND APOGEOTROPISM.

Geotropism is the downward movement of sub-aerial organs. All roots penetrating the ground are guided in their downward course by this factor. The manner in which it acts seems quite clearly understood. Gravitation draws the heavier content of the cells, especially the starch grains, to the bottom of the cell. Here their accumulated weight presses on the sensitive protoplasm and produces a condition of strain, differing from anything in the upper part of the cell, and it is this difference which establishes the line of direction. When the responding mechanism is so set main roots are sent growing towards this pressure, main stems away from it, and side parts across it, precisely as in other typical responses. Geotropism is a perfect example of the fact that a stimulus acts merely as a guide and not as a physical aid to responses. Gravitation might be supposed to help pull roots downward, but it cannot be imagined to push stems upward or to drive side parts crossways.

The geotropism of leaves is disguised by their stronger heliotropism; but that they are geotropic is shown by the positions they assume when kept in dark rooms. Flowers are also exceedingly geotropic. If a long terminal cluster of larkspur be bent over and fastened in that position, each blossom as it opens will turn over individually to the identical position, it would have occupied in the vertical cluster. The position of each separate flower is established geotropically.

Of all the stimuli made use of by plants for advantageous guiding of their parts, gravitation is by far the most important. Plants have in themselves an hereditary tendency to put forth their parts in a symmetrical manner, but they depend upon geotropism to guide those parts to the suitable positions, and thus realize the ultimate shape of the plant. This is applicable not only to the main structures, but to most of the minor parts being the case especially with roots. The fact that geotropism is thus ever tending to hold the plant in a certain upright symmetrical form explains why any one-sided turning in response to other stimuli is of a limited amount, and why the plant always tends to recover its former upright and symmetrical position in case it is disturbed.

Apogeotropism is the reverse of geotropism. Different species and different parts of the same species are acted on by apogeotropism in very different degrees. Young seedlings, most of which circumnuate quickly and largely bend upwards and become vertical in much less time than do other plants, but whether this be due to their greater sensitiveness to geotropism, or merely to their greater flexibility is not definitely known.

A part or organ which is extremely sensitive to geotropism ceases to be so as it grows old and it is remarkable as showing the independence of this sensitiveness and of the circumnuating movement, that the latter sometimes continue for a time after all power of bending by gravity has been lost. Also geotropism acts when very nearly balanced by an opposing force. When the stem of any plant bends during the day towards a lateral light, the movement is opposed to apogeotropism, but as the light gradually wanes in the evening the latter power slowly becomes more powerful and draws the stem back into a vertical position. A stem or other organ

which bends upward through apogeotropism exerts considerable force, such as that of its own weight, which has to be lifted. This is often sufficient to cause the part to bend downward; but the downward course is rendered more oblique by the simultaneous circumnutating movement.

HYDROTROPISM

There is in roots an inherent tendency to move towards a direction where moisture is most plentiful. The advantage of hydrotropism is perfectly evident, for it is the very first function of roots to absorb water. It is believed that water is absorbed more rapidly on the side of its greatest abundance. It undoubtedly causes an osmotic swelling and tension, stronger on that side than on the other, and this difference is ample to establish a line of direction towards which roots turn in their growth. Stems and leaves are obviously not hydrotropic for they do not absorb any water. This fact illustrates the adaptive character of responses; for it is a general rule that plant parts are indifferent to stimuli to which there is no advantage in responding.

It is said that when trees develop in a uniformly moist soil, the root tips tend to collect in a circle just under the outer drip of the foliage, which is obviously the place of greatest dampness. But in case the soil is moister on one side than another, the roots grow more freely in that direction, and the distance to which they will grow is sometimes almost incredible.

CHEMOTROPISM

Chemotropism is the sensitiveness of certain plant organs by virtue of which they change their directions of growth when acted upon by chemical substances. Roots will turn towards a source of supply of some of the minerals they absorb. The pollen tubes in their growth, turn towards the substances

secreted by the stigmas and styles. If the organ bends so as to grow towards the source of the substance it is positively chemotropic to that substance; and if it turns away it is negatively chemotropic. In elongated organs, such as roots, the movement is a matter of growth. The curvature is brought about by the retardation on one side or the acceleration on the other; or by both together. The side on which the retardation occurs becomes concave, while the other is convex. If a root is positively chemotropic towards a substance, the side coming in contact with most of the substance, will be retarded in growth and become concave, as the substance diffuses thru the medium in which the root is growing. If the root is negatively chemotropic, acceleration of growth takes place with an accompanying convexion of the root. Thus the root tip is turned either toward or away from the source of the diffusing substance and the bending continues until all sides are equally stimulated.

MINOR TROPISMS

There are other movements in plants which, although of equal importance with the aforementioned are generally considered modifications thereof.

Aerotropism is a term applied to the power of responding to gases, particularly oxygen, in the same way as chemotropism. Illustration of this is found in water plants having floating leaves. The length of the petioles is altered in accordance with the depth of the water. The petioles continue to grow until the leaves reach a supply of free oxygen, when they stop. This case illustrates the fact that stimuli serve as signals to stop a process as well as to guide it and such are undoubtedly very important in controlling the various processes of growth.

Electrotropism is a certain adjustment which a plant will make to a mild electric current. Thermotropism is the turning of the roots towards warmth. It is very rare and possibly has been confused with other stimuli. Rheotropism is the turning against a water current. This illustrates a confusion of stimuli, for undoubtedly the roots mistake the pressure of the flowing water for a hard object in the soil and attempt to turn away therefrom. There are others which might be mentioned, but they are of lesser importance.

NYCTITROPIC MOVEMENTS

These are commonly called "sleep movements" in plants and are brought about following variations in the intensity of illumination, so that parts have a diurnal and nocturnal position. The sleep of leaves is a phenomenon so conspicuous that it is observed as early as the time of Pliny. Since Linnaeus, the scientist of antiquity published his essay, "*Somnus Plantarum*" it has been the subject of many investigations.

The movements which result from circuninutation, are modified and regulated by the alternations of day and night or light and darkness; but they are to a certain extent inherited. Leaves when they go to sleep move either upwards or downwards, or in the case of leaflets of compound leaves, forwards or backwards,—that is, towards the apex or the base. In almost every instance the plane of the blade is so placed as to stand vertically or nearly so at night. The upper surface of each leaf and more especially of each leaflet, is often brought into close contact with that of the opposite one. This is sometimes effected by singularly complicated movements. This fact seems to suggest that the upper surface requires more protection than the lower. There are plants in which the terminal leaflets after turning up at night so as to stand vertically often continue to bend over until the upper surface

is directed downward, while the lower surface is fully exposed to the sky, and an arched roof thus formed over the two lateral leaflets which have their upper surfaces pressed closely together. Here there is an unusual case where one of the leaflets does not stand vertically at night. The position which leaves occupy at night indicates with sufficient clearness, that the benefit derived is the protection of their upper surfaces from radiation into the open sky and in many cases the mutual protection of all parts from cold, by their being brought into closer approximation.

The nyctitropic movements of leaves are easily affected by conditions to which plants have been subjected. If the soil be too dry, or if the humidity be very low, the movements are much delayed, or fail altogether. Some have advocated the idea that the quantity of water absorbed has a great influence on the movement of leaves and that the variable amount of shrinking of leaves bears a relation to the amount of water in the plant. It is the accepted belief however, that the nyctitropic movements of leaves, leaflets and petioles are effected in two different ways: first, by the alternately increased growth on their opposite sides, preceded by increased turgescence of the cells, and second by means of a pulvinus or aggregation of small cells generally destitute of chlorophyl, which also become alternately turgescent on nearly opposite sides. When pulvini are present, the nyctitropic movements are continued for a very much longer period than when such do not exist.

The sleep of cotyledons is as pronounced as the sleep of leaves. As a general observation, cotyledons provided with pulvini continue to rise or sink at night during a much longer period than those destitute of this organ. In this latter case the movement no doubt depends on alternately greater

growth on the upper and lower sides of the petioles or of the blade or of both, preceded probably by the increased turgescence of the growing cells.

There is an independence of the nocturnal movements of the leaves and cotyledons on the same plant, and on plants belonging to the same genus. This leads to the belief that the cotyledons have acquired their power of movement for some special purpose. Other facts lead to this same conclusion, such as the presence of pulvini, by the aid of which nocturnal movements are continued during some weeks.

The cotyledons of some species move vertically upwards and others vertically downward at night; while in others one cotyledon moves upwards while another moves downward. Biologists are justified however, in assuming that the movements have been acquired at least in most cases, for some special purpose; nor can we doubt that this purpose is the protection of the upper surface of the blade and perhaps of the central bud from radiation at night. All gardeners know that plants suffer from radiation. It is this and not the cold winds that the peasants of Southern Europe fear for their olives. It is a known fact that a thermometer rises as soon as a fleecy cloud, high in the sky, passes over the zenith. Seedlings are often protected from radiation by a very thin covering of straw, and fruit trees on walls by means of a few fir branches, or even a thin netting spread over them. Fruit growers place smudge-pots in their orchards in order to protect the buds.

Many flowers close at night, and these are likewise said to sleep. Their movement is effected by the same mechanism as in the case of young leaves; namely unequal growths on opposite sides, yet they differ essentially in being excited chiefly by changes in temperature instead of light. Very likely they close at times when the pollen is liable to become destroyed,

and thus their movement seems to be one of self preservation.

The analogy between animal and vegetable life is further demonstrated by the well known fact that while some creatures such as the owl and cat, sleep during the day, and remain awake at night, certain plants do the same thing. There are plants which close at nine o'clock in the morning and open at evening time. Every hour of the day has some particular plant which shuts itself up, hence the idea of the flower dial by means of which the hour of the day can be told with a remarkable accuracy. Some plants shut themselves up in the daytime and flower at night. It is said that Linnaeus used to go out in his garden at night with a latern to have the opportunity of witnessing this remarkable peculiarity in the plants in which it is exhibited.

THE RESULT OF DEVELOPMENTS

Thus one may see that the movements of plants are very complex. A casual observation leads one to assume that their movements are very primary and seemingly of little importance to the organism, but upon more complete observations the reverse of this is found to be true. Their movements are extremely intricate and regular, having a direct bearing on the well-being of the plant. It is probable that we have by no means observed all the movements and undoubtedly as the field of biology enlarges and becomes more and more closely related to plant psychology, new movements will be found to exist and the old movements shown to have greater bearing on the life of the plant.

The responses to a stimulus, while it may be highly efficient to the plant, is blindly invariable and not alterable for particular conditions. There is no sign of an attempt to correlate stimuli and respond in a manner which would be best for any particular combination. In this respect, animals have

advanced much further than plants for they have acquired the power of correlation and here is the chief feature which designates the higher animals from the higher plants. Thus out of one and the same origin, plants have developed irritability, which is the response to stimuli, while animals have reflex actions, consciousness and ultimate reason, which is mind.

. . . **POLLEN PECULIARITIES.**—In the course of an article on "Pollen Enzymes" in the *American Journal of Botany*, Julia Bayles Paton mentions various interesting things about pollen grains that may not be known to the general public. A medium-sized plant of maize is reported to produce about fifty million pollen grains and cat-tails (*Typha latifolia* and *T. angustifolia*), which often have sixty thousand flowers in a single spike, produce enormous quantities. Another member of the cat-tail family, the elephant grass (*T. elephantina*), of the East Indies and New Zealand yields so much pollen that the natives use it for making bread and cake. A gram of rag-weed pollen has been estimated to contain one hundred and seventy-two million grains. Pollen grains are said to be very resistant to heat, cold and dryness and certain kinds have been known to retain their vitality for many years. Pollen of the date palm was found by Popenoe to be usable after seven years. In color, pollen varies from white to yellow or dark red. In *Lythrum salicaria* there are two sets of stamens each with its own color of pollen.



NOTE *and* COMMENT



TWENTY-EIGHT MILLION FERN LEAVES.—Nearly thirty million fern leaves sounds like a large number, but this is the number which *Horticulture* reports to have been shipped from Bennington, Vermont, in a single year. To secure these leaves, nearly a hundred thousand dollars were paid out in wages. Such facts as these give some indication of the proportions to which the business of collecting fern leaves, principally leaves of the spinulose wood fern, for the florist has grown. Whenever the florist receives an order for cut flowers, it is his custom to add a bit of greenery in the shape of fern leaves. Many people suppose that the ferns are grown for the purpose as the flowers are, but this incorrect. All are obtained from wild plants. It is still a question whether pulling off the leaves of ferns in midsummer or later will ultimately destroy the plant, but the species in greatest demand is distributed over such an extensive area that it will be many years before the wild supply is exhausted. At present, in Vermont, an insect, by eating the tender tips of the fronds has joined man in destroying the plants.

JAPAN QUINCE.—Supplementing what has been said recently in these pages regarding the fruiting of the Japan or flowering quince (*Cydonia Japonica*), it may be noted that this year, in various parts of northern Illinois, this shrub has fruit ed more abundantly than has ever been recorded before. In many cases the bushes are bending down with their weight of fruit. What has caused this sudden fruiting is not evident unless the flowering period has happened to coincide with a

season particularly favorable for pollination. Ordinarily the habits of this plant have justified the name of *flowering* quince. The plants seldom fail to produce a good crop of flowers, but the fruits are usually so rare that few people have seen them. The writer of these lines has seen the fruit but twice before. The ripe fruits are not greenish-yellow as Bailey's "Cyclopedia" has it, but are clear dandelion-yellow. They average less than half the size of the garden quinces, though many are of fair size.

OWNERS OF COMPLETE SETS.—When we published the list of owners of complete sets of this journal in the last issue, we were aware that two sets had been purchased by F. W. VonOven, president of the Naperville Nurseries, Naperville, Ill., but we did not know that one set had been presented by Mr. VonOven to the Morton Arboretum, of Chicago. The Arboretum, itself was a present to Chicago from Mr. Joy Morton the son of Hon. J. Sterling Morton who originated Arbor Day. Set number 64, therefore, is located at the Morton Arboretum, Lisle, Ill. It is interesting to note in this connection that Illinois holds the record for complete sets. Nine are owned in the State. Massachusetts, New York and Ohio have six each, Pennsylvania has five, Iowa three, and New Hampshire, Connecticut, Indiana, Missouri, Texas, and Colorado have two each. Twelve other States have one set each and three sets are in foreign countries.

PASTURE PLANTS.—We are accustomed to the fact that cows do not eat *Asclepias* and *Ranunculus*; at least our common milkweed and creeping buttercup are left undisturbed when everything green in the vicinity is appropriated. It is interesting to walk into a field where cattle have recently been turned loose and note their fondness for the wild sarsaparilla (*Aralia nudicaulis*). This plant is apparently the first to be

consumed. In a large patch, nothing was left but the balls of greenish florets. Sarsaparilla has the habit of concealing its flowers the same as mandrake. Looking down upon a colony of plants one sees only a dense mass of leaves. Each leaf has three compound divisions on a long petiole. About half as tall, and close beside it, stands the flowering stalk with three or four peduncled umbels at its summit.—*Nell McMurray, Clearfield, Penna.*

OLDEST AMERICAN BOTANICAL GARDENS.—When the subject of the oldest botanical gardens comes up, one's mind is likely to turn to Bartram's garden in Philadelphia, Prince's garden on Long Island, or the Elgin garden in New York. These were all established in the early days of our country, but have long been abandoned as botanical gardens, though Bartram's garden still exists. The botanical gardens that at present are entitled to the name are of comparatively recent origin. The Missouri Botanical Garden is probably one of the oldest, but the oldest botanical garden of America is neither in the United States nor in Canada. For real age, one must turn to the West Indies. The garden at St. Vincent is more than 150 years old and still going strong while Trinidad has recently celebrated the hundredth anniversary of the founding of its garden. Bath garden in Jamaica, though now fallen almost into disuse, was founded nearly 150 years ago and is a close second to the garden at St. Vincent in seniority. East's garden also in Jamaica, was a few years older than the garden at Bath, but it has long since been abandoned. The Jamaican gardens still in existence are much younger. Castleton garden has been in operation about sixty years and Cinchona for nearly as long. The best known garden, Hope, near the city of Kingston, dates from 1873. If there are any gardens in the New World that have a span of life approaching the oldest of these, we would be glad to hear of them.

EFFECTS OF LIGHT ON FRUITING.—Nearly everybody has noticed the tendency of plants to bloom most profusely during the colder parts of the year. Winter, instead of summer, should be represented as garlanded with flowers. Summer has its blossoms to be sure, but the profusion of flowers in autumn is exceeded only by the burst of bloom in the spring. While most of the plants that bloom during the cooler part of the year are restricted to one or the other of these seasons, there are a few, such as the violets, that bloom both in spring and autumn or perhaps they bloom from autumn to spring and are repressed only temporarily by the coldest weather. There is, however, a considerable body of evidence to show that it is the shortness of the day, rather than the cold that induces blooming. Two Government botanists, W. W. Garner and H. A. Allard have been conducting a long series of experiments which seem to settle the matter. They find, however, that plants may be divided into two different categories as regards their response to different periods of daylight. In one, a long period of light induces flowering; in the other it hinders the process. Acting on this knowledge, they have been able to bring the spring flowering *Viola fimbriata* into bloom a second time in July by simply reducing the length of time the plant is exposed to the light each day. On the other hand, the rose mallow, (*Hibiscus moscheutos*) which normally blooms in summer, was not able to flower at all when its light exposure was cut down to seven hours daily. From this the gardener ought to get a hint on growing superior salad-plants. Lettuce and spinach are noted for "running to seed" in late spring and early summer, but by reducing their supply of daylight this tendency is quite eradicated. In the case of the scarlet globe radish which, planted in May, was deprived of some hours of light daily, it continued to vegetate through the sum-

mer and winter in the greenhouse and showed no sign of flowering; though steadily increasing in size until the root reached a diameter of five inches and the leaves were eighteen inches long. Exposed to the full sunlight the following summer, it promptly blossomed. This effect of different periods of light is also held to account for certain phases of plant distribution. Annuals, it is well known, are nearly absent from the tropics since the short days there do not require plants to exhaust their energies in seed production. Outside the tropics, however, the lengthened summer day may speed up the blooming season with the result that the plants become annuals.

FRINGED GENTIANS.—Fringed gentians do not grow near my home, so last fall a friend sent me a large boxful from Massachusetts. The books say a plant of fringed gentian may have as many as thirty of the showy flowers; twenty was the most on mine. They were all asleep when they arrived and in spite of coaxing would never open of their own accord, thus showing their relation to the bottle gentian. My fingers spread the petals and their blueness and irregular fringe were enjoyed. When discarding the bouquet two weeks later, a stalk with a fragment of freshness and a bud was noticed. This last stalk was kept in a vase of water near the radiator where much heat is often felt and on the fourteenth of October without any help from me the corolla spread naturally and was the only one that did so. The smallest and palest of all and yet the one that behaved the best. For eleven days it opened in the morning and closed in the evening and then losing the power to move it stayed open all the time and not until the first of November did the edges curl up and really fade after nineteen days of life. It was frailer than those that developed out of doors, but I wonder if they can boast of so long a life.—*Nell McMurray, Clearfield, Pa.*

CULTIVATING YELLOW LADY'S SLIPPER.—I am a great admirer of our native orchids but have never been successful in growing them though I have given them leaf-mold, abundant moisture, and supplied their wants as well as I knew how. A year ago I decided to make one more trial and bought three plants of the small yellow lady's slipper. All lived through the winter and appeared promptly in spring but seemed very frail and weak. They had about reached the point where I felt they should not be left alone nights when I read that oak leaves and twigs added to ordinary soil would produce the acid condition of soil necessary for the health of bog-loving plants. I immediately procured some oak leaves, and after chopping them very fine mixed them very thoroughly with the soil. In a short time the plants began to stiffen up, whether from rheumatism or increasing vigor I cannot say, and while they did not bloom they bid fair to go through another winter and I hope for blossoms next year. Needless to say I shall add all available oak leaves to the compost for my boggy beds next year—that is, unless somebody tells me it is all wrong!

—*Adella Prescott, New Hartford, N. Y.*



EDITORIAL



Ask any resident of the South to name the most beautiful flowers of that favored region and he will at once mention the crepe myrtle, the azalea, the dogwood, and perhaps the Cape jessamine. No matter what other plants he names, he is pretty certain to put the crepe myrtle first. Though this plant has not yet reached the dignity of a national flower, it has at least become a sectional obsession, like corn bread and fried chicken. It is quite possible, however, that the Southerner is quite justified in his position. When the crepe myrtle has reached maturity and some time in early summer bursts into a living cloud of watermelon-pink, it is truly one of the most beautiful of shrubs in this or any other country. It is a perpetual delight to the eye, regardless of its location and always has a certain dignity of bearing about it, whether bending in shelter over the humble cabin of the negro or flashing from the shrubbery of some lordly estate. Mahomet, who advised one of his followers with two loaves of bread to sell one and buy some narcissus flowers because bread is merely food for the body while flowers are food for the soul, doubtless never saw a crepe myrtle in bloom. The narcissus at its best is a handsome flower, but, even at its best it is no match for this resplendent shrub. In northern gardens several of the lilacs might be thought not unworthy to compete with the myrtle for the crown of beauty. The Persian lilac, especially, seems at times only a smaller copy of its Southern rival. But

who are we to make comparisons? Neither plant is a product of the region that claims it. Though both have long been grown in this country, the crepe myrtle is a native of India and the Persian lilac, in spite of its name, comes from China.

BOOKS AND WRITERS

The Reviewer and his best friend the Editor, have been in the South all summer. * * * The Editor has been teaching, * * * Our desk is still several inches deep in things to be reviewed. * * * We think it is an oak desk but we have not seen the top for so long we are not sure. * * * The things that might be reviewed and the things that ought to be reviewed are all mixed up. * * * We shall have to mention them all, we suppose. * * * We hear that Walter Stager has published a book on Irises, but we haven't seen a copy. * * * This might be construed as a hint to the publishers. * * * Scribners have published a book on "Hardy Perennials" by a British writer.

* * * We expect to say something more about it later.

* * * Dr. Edward Blake Payson has sent us a copy of his Monograph on the genus *Lesquerella*. * * * Lesquereux knew all about the mosses, but the really big thing he did was to get this genus named after him. * * * Payson says there are more than fifty species in it. They are all rather insignificant plants of the Rocky Mountain region.

* * * The account of the Gray Herbarium expedition to Nova Scotia has been printed in a single volume. * * * It was originally published serially in *Rhodora*. * * * The Gray Herbarium itself did not go, but several of the Staff did. * * * It required more than 200 pages to tell

of all the new, rare, and otherwise interesting plants found.

* * * And some folks thought all the new plants in Eastern America had been discovered! * * * A new fern book is coming out in time for the Holidays. * * * Rev.

Geo. B. Tilton, the author, says it will be called the "Fern Lover's Companion". * * * It ought to be well received; there are only two other volumes on the subject in print.

* * * C. A. Weatherby sends us a copy of his paper on the Group *Polyodium lanceolatum* in North America. * * * -It is published in "Contributions from the Gray Herbarium of Harvard University." * * * We sent him one or two observations on a rare species from South America that in some way has moved into Jamaica. * * *

In the same publication, J. Francis Macbride upsets a lot of Rydberg's highly ornamental names in the genus *Parosela*. * * *

They are having a delightful "tis" and "tisn't" time and nobody else is the wiser. * * * Macbride must be a friend of Piper's. He says that Piper's revision of *Allocarya*

is one of the finest. * * * He thinks the *American Botanist* is impolite in poking fun at a genus of 79 species founded on the way the seeds are wrinkled. * * *

But we could not swallow all those seeds! * * * Wonder what he would do with a quart of dried peas * * * The *Gladoli* *Bulletin* has begun publication. * * *

It is edited by Stanley Thorpe of Medford, Mass. * * * Lee R. Bonnewitz is issuing a series of *Garden Notes*, principally on irises and peonies. * * *

Looks as if it might develop into another plant journal. * * * It is published at Van Wert, Ohio. * * *

We learn from the Secretary of the "Society for the Protection of Native New England Plants" that it is not an additional society but a combination of three others of similar nature. * * * This may account for

the seventeen-syllabled name * * * The Massachusetts Horticultural Society has issued an excellent list of Wildflower literature. * * * Most of the worth-while books are in it. * * * The "First Book of Grasses" by Agnes Chase is announced for publication by the Macmillans. * * * If the author can make the identifications of the grasses easy her book ought to be one of the "best sellers". * * * However, a book in the hand is worth two at the publisher's and it is time we turned our attention to some of those in hand.

From the Oxford University Press, comes a neat little volume entitled "Junior Botany" by T. W. Woodhead. This is designed for use in British schools where a larger volume is impracticable and is a good illustration of how they do things "on the other side." In the main the subjects discussed are similiar to those that make up the contents of American school books on the same subject, though the latter usually touch upon several phases of botany that are not mentioned in the present book. By substituting American plants for the European species used for illustration the book would be quite suitable for class work in the United States. "Junior Botany" is described as a simplified and abridged edition of the author's "Study of Plants" and has apparently been written with a view to enable the beginning student to classify his specimens. This aim of botanical texts, it may be said, has largely been discarded in America in favor of studies in ecology, the lower forms of plant life, economic plants, and the like. The book will be of interest to all teachers for the light it throws on the methods of teaching botany abroad. It is published by the Oxford University Press, American Branch, New York.

Four more parts of O. Penzig's "Pflanzen-Teratologie" have been received from the press of Gebruder Borntrager, Berlin, Germany. Earlier numbers of this work gave a very

extended account of all the abnormal plants known, and listed the polypetalous dicotyledons in which such abnormal plants have been found. The parts just received continue this list through the gamopetalous dicotyledons, the monocotyledons, the conifers, the ferns, mushrooms and even the algae. Under each species are described all the abnormal forms reported for it and the place of publication of each example is given. In preparing this work, the literature of the whole world seems to have been carefully searched. Those who are engaged in the study of plant "freaks" will find this work simply invaluable for reference. The price is \$6 unbound.

Dr. William Mansfield's "Botany, Developmental and Descriptive," is a textbook designed for use in high school and college but one that favors a type of work quite unlike that which ordinarily finds a place in such institutions, because it is frankly an introduction to classification. Such books, however, are still in demand by students of medicine and pharmacy where the identity of a given plant is often of prime importance. Judged by its usefulness for the purpose intended it seems to have very little in it that cannot be heartily commended. It may be said, however, that although it is logical to begin such a book with the one-celled algae and end with the highest flowering plants, this is not the order likely to appeal most strongly to beginning students. We should have been inclined to reverse this arrangement. The forms taken as examples are carefully and accurately described and the 135 illustrations are mostly new and made from photographs of drug plants. The text is remarkable for the number of simple declarative sentences it contains. To those familiar with botanical literature, the book is likely to recall Gray's "Lessons with Plants" and Rusby and Jelliffe's "Morphology and Histology of Plants". For present day purposes, how-

ever, it is probably better than either. Certainly the student interested in the basis of classification will find this a clear presentation of the subject. The book is a 12mo of 232 pages and is published by Lea and Febiger, Philadelphia.

A new laboratory Manual for the study of biology is W. H. D. Meiers' "Study of Living Things". It consists of a pad of 96 sheets, each sheet containing various questions to be answered on a given subject ranging from algae and garden-making to teeth, houseflies and bulb-growing. The questions are pertinent and well selected but it strikes the reviewer that a few are rather impracticable, at least with students in secondary schools. Take the fourth exercise, for instance, in which the student is asked to discuss the helpful and harmful factors in the environment of a plant and to decide whether the plant is spreading or losing ground. This could scarcely be decided with any degree of accuracy by a child in a single season. Older students would find such an exercise less difficult and even the average teacher might discover food for thought in many of the questions. The work is bound in paper covers and published by Ginn & Co. The price is 80 cents.

At a time like the present, when eminent Chautauqua lectures and Southern legislators are doing their best to convince the public that there is no such thing as change, a reprint of Samuel Christian Schmucker's "The Meaning of Evolution" is most appropriate. It is not likely that any thinking person really doubts the facts of evolution, though like the scientists, themselves, he may question the explanations of many of its phenomena. Dr. Schmucker's book is an elementary treatise, devoid of technicalities and designed to meet the needs of the general reader. In twelve chapters covering upwards of 300 pages, he discusses the evolution of the idea of evolution with a reasonableness that must appeal to all who

read the book. There are chapters on adaption in species and individuals and one on the evolution of the mammals. The reader may doubt some of the conclusions drawn by the author in the chapters on the future evolution of man, and science and the Book, but these are not pertinent to the main subject and may be disregarded if desired. The fact that the book has been reprinted four times is some indication of its popularity. It is published by the Macmillan company, New York.

But the supreme gift of the fall, that which not seen leaves the year uncrowned and one's memory the poorer, is the gentian whose twisted buds open to the September sun and rarely as now brave the winds of November. The gentian is a typical wildflower, resenting cultivation, shy and capricious in habit. It may be sought through the livelong day and turning you have at your feet, a dozen erect stems raising their flowers to the sunshine. One year a low meadow will be blue as the sky above, the next not one is to be found. But the flower itself is openhearted and frank in expression, gladly giving its message of cheer quite unlike its sister the closed gentian whose vase-shaped, dark purplish-blue buds never open. They puzzle their new acquaintance who vainly watches for their unfolding, and their sinister aspect might repel even their true lover and tempt him to relegate them to a place among the mystic herbs gathered in the full of the moon for a witches' cauldron.—MARTHA B. FLINT.

THE AMERICAN BOTANIST

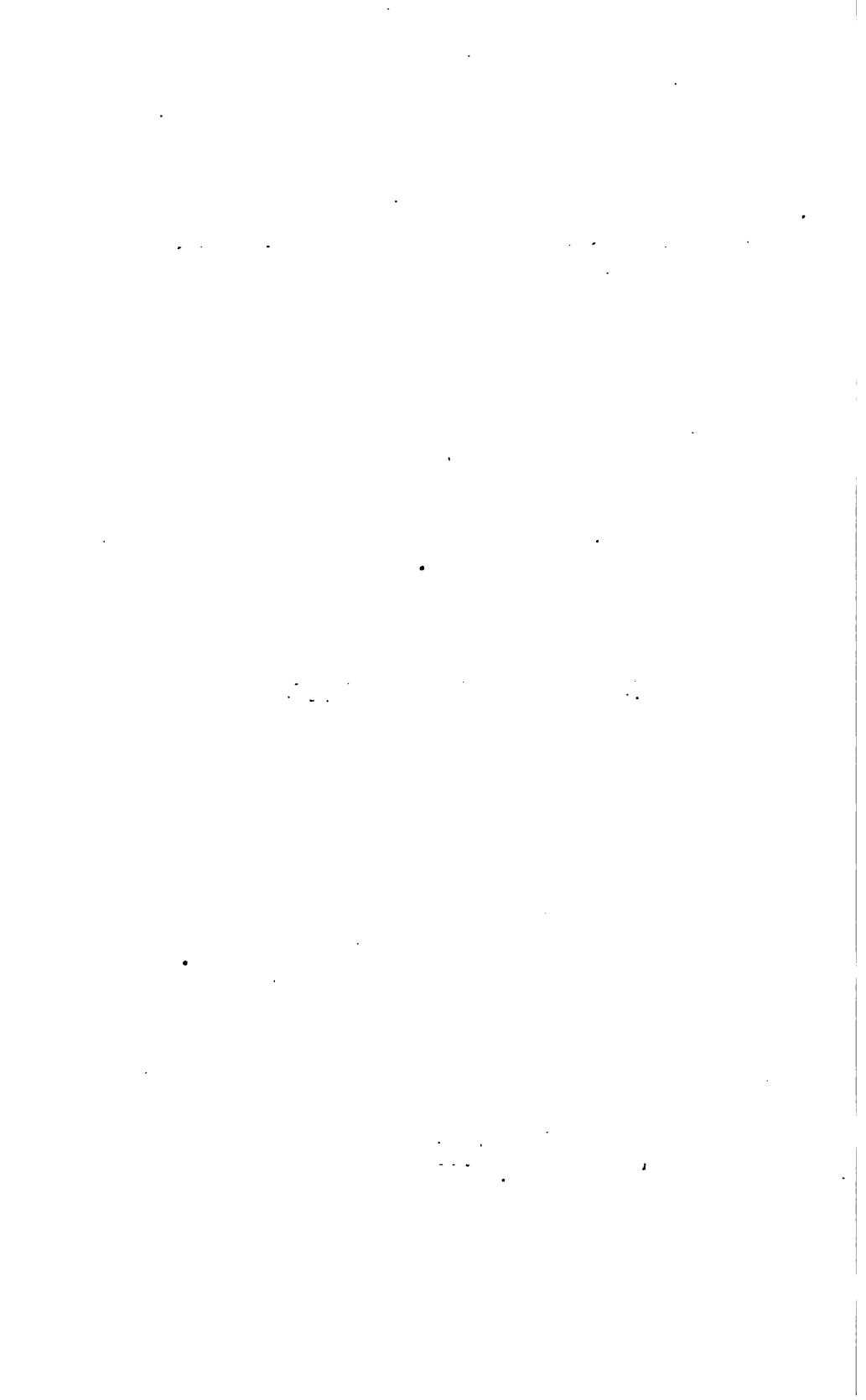
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THE RESURRECTION FERN—*Polypodium incanum*.

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*High in the air the maples show
Their first faint tints of crimson glow;
Hazel and poplar everywhere
Are sifting pollen on the air;
From plumy elms in gray and brown
The bud-scales shimmer softly down;
The mourning—cloak is on the wing
And wandering breezes whisper, "Spring."*

THE RESURRECTION FERN

By WILLARD N. CLUTE.

EPHYTES are not abundant in temperate regions. At best the list includes only a few algae, mosses and lichens with no suggestion of higher forms such as the ferns and flowering plants, but as the tropics are approached the variety of epiphytes increases enormously until in the rain-forest bordering the equator a host of orchids, ferns, pitcher-plants, bromeliads, peppers and numerous other flowering plants crowd the branches of the giant forest trees.

In our Southern States we find the first outlying colonies of the flowering-plant epiphytes in the gray or Spanish moss (*Tillandsia usneoides*) which is not a moss at all but a member of the pine-apple family in good, regular standing. With it grows the subject of our sketch, the gray polypody or resurrection fern (*Polypodium incanum*). The species, through growing in the same general region divide the territory between them, the *Tillandsia* preferring the upper branches

of the trees from which it hangs in long festoons, while the polypody forms colonies on the trunk and larger limbs.

The polypody derives its name of resurrection fern from its habit of curling up during dry periods and apparently coming to life again when it rains. The plant does not actually die during the drouth but remains in a state of suspended animation much as our perennial plants do in winter. The drouth is the polypody's winter. So fixed is this habit in the plant, however, that even when it is dead and reduced to a mass of brown and dry vegetation, it will spread out its fronds if soaked in water. It is, however, a somewhat difficult matter to know when such a plant is really dead for cases are known where specimens have survived for more than a year without water.

There are an immense number of plants in the world which have the ability to renew growth after a period of dessication. Often they are rooted in the soil as in the case of *Selaginella lepidophylla* another resurrection fern which, is misnamed for it is not a fern though closely related to such plants. This plant curls up into a compact round ball when dry and is frequently offered collectors of curios. Various flowering plants have the habit of resting thus especially in the rain forest. Here, however, the period of drouth is likely to be of short duration and therefore offers no such test of vitality as our polypody must often undergo. Since it grows as far north as southern Illinois, it must often encounter both drouth and cold. It is well equipped for the battle, however, for its fronds are closely set with tiny brown and gray scales which enable it to hold tenaciously any moisture it may absorb. Our frontispiece is from a photograph showing a colony of these plants on the base of a large oak and was made in Florida by Mr. W. M. Buswell.

BOTANICAL NOTES FROM TAHITI

By J. O. STANCLIFF.

THE silk-cotton or kapok tree forms a striking part of the scenery of Tahiti. In its spring garb it is covered with pensile, somewhat banana-shaped cotton pods which hang full to bursting. The cotton is fine for packing shell necklaces for mailing to small nieces at home.

The steamship folder says Papeete is situated in "a forest of flamboyant trees" but the principal trees embowering the harbor front are a form of locust which a writer calls algaroba and which a high authority in far-off Washington says is *not* the carob tree but a near relation thereof. The hard-shelled fruit contains a sweet pulp which is inedible unless possibly it is relished by stock.

"Flamboyant trees" have now a lacy green foliage, a few red blossoms, and their fruit. A medium sized tree with bare branches like a buckeye, or branches beginning to be leafy, bears now fragrant white and cream-colored magnolia-shaped blossoms. Some call it the French pine from its use by the French in cemeteries, but I am told that the natives have a sort of superstitious horror of it. The small pink blossoms of lofty cassias strew the streets in places, *Bougainvillea* is now covered with gay lilac-hued flowers, and at Faaa, the next village west of Papeete, a fine vine is smothering a half-dead flamboyant with its lilac blossoms. At Faaa too, is a huge banyan.

Lantana is a sturdy bush which here spreads and forms dense brambly thickets. It has very attractive flowers of a bewildering variety of combinations of pink and yellow. It is however, considered a great pest by planters on account of its impenetrable tangles. It is found also in the Fiji's. I am told that it was introduced here by a French missionary who imported it for his flower-garden.

A hibiscus species known as purau has lemon-colored blossoms very like cotton-tree blossoms and very tough bark used locally as cordage. The cotton-trees in the yard of Mr. Campbell in Papeete are ten or more feet in height, bearing buds, flowers, and both green and ripe bolls at this time. These plants are also found in a wild state.

A species known as black acacia bears large white globular blossoms and forms dense jungles amongst coconut groves if allowed to grow. Another species with small yellow flowers deliciously fragrant, seems identical with the Texas acacia. Tamarind trees are frequently seen, mostly in green pod. Coming back to the ground one first sees a long-stemmed, dark red pea-shaped blossom on a species of weed commonest along the surfless, reef-protected beach. Various tough yellow-blossomed mallow weeds are used to make the brooms used by the local "whitewings" who are convicts. The pink-flowered sensitive plant has smaller blossoms than the familiar *Morongia* of the southern United States. A cucurbitaceous vine with rather small yellow flowers is also found pretty much everywhere in the country. It bears small ornate "pumpkins" like fairy lanterns. A small-flowered species of *Passiflora* is also abundant in places.

The dayflowers (*Commelina*) are of two kinds, a small-flowered running kind with the third petal blue and a larger flowered kind with the third petal white. The first is by far

the more numerous and forms extensive beds far up the Fantaña valley where it narrows. The only "dandelion" I have found is bright red, with branched and somewhat leafy stems that are several flowered. There is also a faded pink edition of this same flower, mostly on the eastern side of the Island. At one point of the shore road near Papeete, I found *Sonchus* in a verdant spot at the foot of a bluff where it grows with a double-blossomed fabaceous vine, the dayflower and others. I have since seen it elsewhere. A blue vervain is common, quite bushy in favorable locations and bearing florets which seem large for this genus. There are two species of *Baptisia*(?) just as in the Gulf States, one slim-spiked, the other larger flowered.

The common *Convolvulus* is small-flowered and heart-leaved with a concealed, deep-red center. The sweet potato of the islands is also a *Convolvulus* with purplish pink flowers.

Another species has yellow blossoms borne in clusters which at a little distance are in appearance not unlike a large *Chrysanthemum*. Still another grows on the sands of the beaches and has large somewhat fleshy round leaves and large purplish-pink flowers. A heart-leaved species of the same shade grows along roadsides.

A plant almost exactly like *Mitchella repens*, but with larger and more succulent fruit, grows in moist woods, especially near waterfalls. A certain tenacious plant known locally as false tobacco is a troublesome species. I have often seen it near Houston Texas. There are at least two *Eupatorium* species, I think, in Tahiti. A herb-like or somewhat bushy mallow with large red-centered yellow nodding blossoms grows commonly along the Papeete-Faaa stretch of beach road. In one spot only, not far from a deserted residence, I found some very attractive deep-blue pea blossoms corresponding to *Cli-*

toria mariana of the Southern States except in color. They grew on vines twining over the roadside. A small tree called piti by the natives is very abundant and bears handsome yellow trumpet-shaped flowers like those of *Gelsemium sempervirens*.

The first fern one sees in quantity is a pedate maidenhair-shaped bracken species. It is found on all dry hills. The ferns of Tahiti are most interesting. They grow in all shapes,—broad, narrow, parasol-like, fan-shaped,—and on rocks, on trees—anywhere, apparently. They grow to the sizes of small trees and some are even said to have trunks like trees but I did not happen upon these last during my limited stay in Tahiti. I found *Lycopodium* but once, near Taravao where the ocean nearly cut the island in two. I think the species is *L. cernuum*.

A little triangular fern and a delicate maidenhair are found up the Fantana and elsewhere. There is also a fern resembling precisely *Onoclea sensibilis*. In a book by F. W. Christian descriptive of the Marquesas, mainly, will be found a list of the Marquesan ferns which in many respects are like those of Tahiti. Another remarkable feature of Maiatea valley is the mistletoe and other hanging vegetation growing on the horizontal branches of trees. The enormous dark arrow-shaped leaves of the wild taro are commonly seen in the narrow valleys and along shady stream banks.

One of the finest plants of the South Sea Islands is the mango-tree whose oval, golden fruits are now ripening under the hot tropical sun. Not even the large-leaved bread-fruit can excel it, nor can those magnificent feather-dusters the coconut palms, nor the spiny dark-leaved citrous trees with their piquant globes. Last but not least in the golden mango tree.

BOTANY FOR BEGINNERS—V

By WILLARD N. CLUTE

WE take the plants and animals of this world so much as a matter of fact that we seldom pause to consider the important and remarkable differences that separate them from all other members of creation. When we do investigate the matter, however, we discover that plants and animals are the only things we know that are alive. But when we ask ourselves what this aliveness means, or in what it consists, we may be puzzled for an answer. As regards the fundamental substances out of which all living things are made, they do not differ in any essential way from the substances found in lifeless material elsewhere. A little carbon, oxygen, hydrogen and nitrogen and still smaller quantities of sulphur and phosphorus are all that Nature needs to form living matter, while to carry on the business of living, such matter requires only minute amounts of iron, calcium, magnesium, potassium and oxygen.

But life does not consist of these elements or of any combination of them. Life is far subtler. Its grosser manifestations are indicated chiefly in the ability of the organism to take to itself additional particles of the substances mentioned, to build them up into new combinations useful to it, and to excrete or throw out matter no longer of value. Moreover, when the elements are combined in the form of animals or plants, they are affected by time and have a youth, maturity

and old age. In the end they die and the elements of which they were formed become disassociated and may again form part of other organisms, but the elements themselves have neither a youth, maturity, nor old age that can be measured by our common time standards. But though the individuals may die, the group to which they belong does not disappear because it is constantly being renewed by processes of reproduction which all possess whereby, on coming to maturity, they give rise to smaller and younger organisms like themselves. Lifeless matter cannot reproduce or increase in this way; in fact, no new forms of living matter originate of themselves. All life from pre-existent life is the law.

To carry on the business of living, or in any other activity, a certain amount of energy is needed. This energy plants secure from the sunlight, by means of the green coloring matter known as chlorophyll. This color is able to change some of the light energy falling on it to electrical energy and by means of this, plants combine hydrogen, oxygen and carbon into foods, which, like storage batteries, hold the energy until it is desirable to release it. Oxidizing the foods releases the energy. This latter process is called respiration and is practically equivalent to breathing, as commonly understood. The animals lack this green coloring matter and cannot make food for themselves. They therefore rob the plants for their own uses. Even man, himself, finds it necessary to do this.

The simplest plants consist of single cells but the size of such organisms in no way limits the functions that distinguish living things from non-living. Although most of the plants with which we are familiar are made up of vast aggregations of cells, there are many one-celled organisms on the earth. Practically all of the germs that cause disease in man, the other animals and the plants are one-celled, while it is well known

that even the highest plants begin as single-cells. In the main, however, the tide of life has flowed on to larger and more complex forms. Among the plants this tide might be said to be heaped, here and there, into waves, or the situation might be likened to a mountain range in which an occasional lofty summit rises above its fellows, with many lesser peaks about it which are themselves surrounded by foothills. One of these summits might be labeled algae and fungi and imagined to consist of some eighty thousand different forms, or species. A near-by peak may be thought of as representing a group of nearly twenty thousand mosses and another, slightly smaller, may stand for the ten thousand ferns. Then, towering over all, the mightiest summit in the vegetable world comes that peak representing the flowering plants, more than one hundred and fifty thousand in number.

All the groups mentioned have their devotees; indeed, some small division of one group may provide interesting employment for a lifetime. Favorite groups for study are ferns, the mushrooms, the algae, the grasses, the asters, the lichens and the hawthorns. One American botanist is widely known for his studies of the slime moulds, and another for his work on the Laboulbeniaceae, a group of more than 150 species of fungi so small that they live on the bodies of beetles. Before you can study such plants you must catch your beetles and buy a compound microscope!

The flowering plants, because of their beauty, attract by far the greatest number of students. Not all flowers are beautiful, however, or even conspicuous, for that matter. There are some so insignificant in size that they consist of only a single stamen and carpel which cannot be seen without a high-power lens. From the plant's standpoint, however, such an insignificant flower may signify perfection, for the sole

business of the flower is to produce the pollen and ovules whose contents, united, will give rise to a new plant. But we must not hastily assume that nature is satisfied with pollen and ovules from the same flower. Far from it. She has ten thousand ways of securing pollen from distant flowers and preventing the flower's own pollen from being used at home. The two agents commonly depended on for transporting the pollen are the wind and the insects. The wind works for nothing but the insects have to be beguiled by nectar or extra pollen, and directed to these supplies by color, odor, nectar-guides and properly shaped corollas.

Wind-pollinated flowers are naturally dull-colored for there is no use in wasting the refinements of color on anything so unappreciative as the breeze. Such flowers produce large amounts of pollen to insure that some at least will be borne to the waiting carpels. The pollen is light in order to travel long distances before coming to the earth and it is usually scattered before the leaves are spread. Most of our early spring flowers have this type of blossom. It appears clear, then, that all our most beautiful flowers are in a very real sense, presented to us by the insects. Not that the insects have acted consciously in the matter, but it is certain that without the insects, flowers would all have been much like those of the pine, hazel, grass, cat-tails and alders.

Flowers pollinated by the insects are more certain that their pollen will go by the most direct route to other flowers and therefore do not find it necessary to produce so great an amount of pollen, but the problem is not as simple as this. There are small creeping insects to be excluded for they would only waste the pollen,. Various schemes must be devised to secure the visits of the insects and get them well dusted with pollen when they appear. Some flowers are run wide-open

and all who will, both large and small, may call and enjoy the feast, but our better kinds of blossoms are more aristocratic and entertain only a select few. These shut out the small insects by numberless devices, or they store the nectar in nectaries so deep that only the larger insects can reach it. Moreover, many of them have learned that if the flower is turned sidewise the insect must always alight in the same place and in consequence the pollen supply, if borne in the right place, may be still further reduced. The wild rose, which is spread open to all comers, may have a hundred or more stamens, but the number in the flowers that face sidewise is seldom more than ten and usually only five. Indeed, the mints and figworts have but four stamens in each flower, or often only two, many of the orchids get along with a single stamen, while the canna manages to be pollinated with only half a stamen.

THE CHARM OF BARE BOUGHS

BY ADELLA PRESCOTT.

IT is quite the fashion among a pessimistic class of people to speak of autumn as a period of death and decay and to bewail the coming of the cold and dreary winter. I am not very fond of cold weather, myself, but every season has its own special attractions and to me one of the charms of autumn and winter is the unburdened trees. The bulbous and herbaceous plants of our north-land seem to regard the winter as strictly a rest time, a few leaving a tuft of green leaves to cheer the pessimist, but most of them cuddling down into the soft warm soil for a long nap.

The trees take it as a vacation period, when all their duties and responsibilities falling off with the falling leaves, they refresh their souls with a wide outlook and stretch their light-

ened limbs in many a gleeful frolic with the winds. In summer the burdened branches sway slowly and reluctantly in the light breeze and thrash heavily in stronger winds, but in winter every twig and branch responds lightly and lithely to the sweeping gales.

Never is the beautiful structure of trees so noticeable as when the softly blending leaves have fallen, leaving each curve and angle to stand out sharply against the wintry sky. And how varied these curves and angles are! Not only has each tree its own characteristic way of reaching out to the light but each twig solves its own problem to suit itself and the eye finds an unfamiliar source of interest in following these solutions as revealed by the nudity of winter.

The sycamore flings its gaunt and ghastly branches wide open to the sun but it is hard to believe that life remains in its body, so ghostly is its appearance. It is one of the most striking landmarks of the wintry landscape and even a careless eye can hardly miss it. At the other extreme are the pot-hooks of the horse-chestnut which looks like sooty iron and by rights should be hanging in a roomy fireplace rather than from the limbs of a tree. Between these two extremes there are many variations from the wand-like branches of the willow to the stouter twigs of the beech and maple.

Not less interesting than the many variations of angle and curve is the bark which is largely hidden by the leaves in the summer. The sycamore owes its ghostly appearance mainly to the color of its bark, but for sheer beauty I think the beech surpasses all others though the "tatterdemalion birch" with its rags and tags of silken tissue in silver or golden-brown is a close second. The golden bark of the willow, the shining red-brown of the wild cherry and the deep red twigs of some of the dogwoods are some of the most striking examples of varia-

tion in color but the number is as many as the trees; and the texture varies even more perhaps than the color. Surely with all this waiting just outside our door or window, we have only ourselves to blame if we find winter devoid of interest and charm.



FEIJOA SELLOWIANA

THE warmer parts of the world possess a wonderful variety of fruits which are rarely seen in temperate regions for the reason that they cannot be produced outside of the tropics except under glass, while their perishable nature prevents their being shipped to distant markets. Even the names have a foreign sound as sapodilla, cherimoya, mangosteen, guava, grandilla, star-apple, ceriman and durian. Some of the

hardiest of these, however, are finding their way into the gardens of the South and West and are thus becoming more widely appreciated. This is the case with the fruit shown in our illustration which though grown in California is still so rare as to have no common name. Botanist call it *Feijoa Sellowiana* but from its looks, taste, and habitat, it might well be known as the Argentine guava.

Feijoa Sellowiana belongs to the Myrtaceae or Myrtle Family, a group of some thirteen hundred species found mostly south of the equator and especially common in South America and the East Indies. There are no species native to North America but the pomegranate, commonly cultivated in southern gardens, is much like the Myrtaceae in appearance. Among species of this group well known by name at least are allspice, cloves, Surinam cherry, rose apple, Jambolan plum, bottle-brush, eucalyptus and Brazil-nut.

The name of the family is derived from the classic myrtle of Europe. This latter species is possibly more famous for yielding the bay-leaves commonly used in cookery. As a matter of fact the leaves of most of the group are dotted with tiny glands containing a fragrant oil and the fruits usually have a pleasant odor as illustrated in the allspice. This is true of *Feijoa* fruits whose odor suggests that of the Cape jessamine (*Gardenia jasminoides*.)

The fruits themselves are two or three inches long, and about half as thick, broadest in the middle and tapering toward the ends. The end opposite the stem is crowned with the remains of the four sepals. The fruit is green when ripe and has a rather thick skin surrounding a pale reddish, somewhat watery, pulp that is sweet and edible, with a flavor that has been likened by different people to that of pineapples, guavas, bananas and strawberries. To the writer it suggests

the odor of buckwheat honey with a hint of cloves. From this it might be inferred to approach in flavor the mangosteen (*Garcinia Mangostana*) which is said to include in its pulp the flavor of all other fruits and to be the fruit with which the Serpent tempted Eve.

Feijoa comes from the Argentine and is likely to find a welcome wherever it can be grown. It is said to be popular in Southern France. It is a medium-sized tree with small, oblong entire leaves white beneath. The fruits are produced singly along the twigs and at their tips. We are indebted to Mrs. Jay C. Jenks, of Halcyon, California for the fruiting specimen here figured.

VALUE OF PRACTICAL BOTANY

A SHORT time ago the writer attended a farmers' field day that was in charge of the county agent. The county agent was a well trained man, a college graduate, as was evidenced by the ease and accuracy with which he answered question after question. Finally a farmer approached with a specimen of one of the common weeds growing in the pasture and requested that the plant be identified. For the first time that afternoon the county agent fell down on the job.

A specimen of plant was received from a county agent last summer with the explanation that it occurred abundantly in alfalfa fields in his county and threatened to become a serious alfalfa weed. Upon examination the plant in question turned out to be a dwarfed specimen of common alfalfa.

These incidents are cited because they illustrate a general condition among trained agriculturists, a lack of knowledge of many of the common plants that grow on our farms. Many men who are well trained in other phases of agriculture, ex-

hibit lamentable ignorance concerning common farm weeds. This condition may be due in part to the unfortunate manner in which the general study of systematic botany has fallen into a state of neglect. Had the county agent who sent in the specimen of alfalfa learned to recognize the plants by their botanical characteristics, it is doubtful if he would have made so foolish and embarrassing a mistake. Perhaps the old-fashioned method of dissecting flowers in the laboratory can be made more attractive and profitable to the average student by a field study of the weed flora and approved methods of eradication and control.

It is suggested, then, that men in agricultural courses should make an effort to learn to recognize the common weeds and familiarize themselves with the methods by which troublesome weeds may be controlled. A great deal of this knowledge can be gained during under-graduate days by collecting specimens during hikes into the country and by identifying them and becoming familiar with their characteristics.

A knowledge of the farm flora may prove an asset in almost any field of endeavor that the trained agriculturist may select, from practical farming to teaching or demonstration work. For example, a specimen of a plant received some time ago from a college trained farmer with the statement that the sender was acquainted with most of the wild plants growing upon his land, but the specimen sent was new to him. It turned out to be the black knapweed or star thistle (*Centaura nigra*), a plant that is not common in the United States but considered extremely troublesome in Europe. The sender was advised to destroy immediately the few plants upon his farm before seeds were matured. This was done and no further trouble was experienced. It is entirely reasonable to believe that his knowledge of plants enabled the farmer to

recognize the stranger upon his land and it is possible that his foresight may have saved his community from the ravages of a new weed pest.

New weeds are constantly appearing in our midst, as witness the Russian thistle, sow thistle, and Russian pigweed, and more recently the lawn pennywort and leafy spurge. Not only are new weeds introduced from abroad, but native weeds are carried from one section of our country to another. Thus the blue sage (*Salvia lanceaefolia*), a western weed, has recently appeared in Ohio alfalfa fields where it was carried by the agency of impure seed from the west. The bracted plantain (*Plantago aristata*), one of the species designated as noxious in the recent Indiana Seed Law, is a western species that has been widely introduced in the east by means of baled hay and impure grass seed. A knowledge of the farm flora is of distinct advantage in recognizing new weeds and may be of considerable value. If the first patches of Russian thistle had been recognized as a new weed and immediately destroyed, the saving to agriculture would have been great. The farmer should be ever on the alert for new weed pests, but it is first necessary to become familiar with the common plants occurring in our fields so that strangers can be immediately recognized and adequate eradication measures instituted.

Entirely aside from the practical value, the pleasure derived from a knowledge of plants is worthy of consideration. Such a knowledge has a recreational value that cannot be estimated in dollars and cents. The joys of country life may be greatly enhanced with the surrounding flora. It is an inspiration and a pleasure that cannot be valued by the ordinary standards.—*Albert A. Hansen in Purdue Agriculturist.*

PLANT NAMES AND THEIR MEANINGS—XIV

SCROPHULARIACEAE

By WILLARD N. CLUTE.

THE Scrophulariaceae comprises some 2500 different species very widely distributed over the earth but most abundant in the Temperate zones. Many species have a close superficial resemblance to the mints (*Labiatae*) since they possess square stems, opposite leaves and two-lipped flowers but the flowers are much larger, though generally lacking fragrance, and they are more commonly borne at the top of the stem in panicles and thyrses though Gray says that none have a truly terminal inflorescence. The most trustworthy character for separating this group from the mints is found in the fruit. In the Scrophulariaceae this is a many-seeded two-celled pod; in the *Labiatae* the fruit breaks up into four nutlets. The group derives its name from the genus *Scrophularia* which is said to be so named because used for the cure of scrofula. The plants of this genus have long been known as figworts, and by an extension of the name the members of the entire family are so called. The plants in no way resemble figs, however, and the true fig does not belong to this family. The origin of the name may be found in the notes on figwort. By some the family is called the Rhinanthaceae for the genus *Rhinanthus*.

As in the mints, a large number of the Scrophulariaceae have reputed or real medicinal properties. After *Scrophularia* whose derivation as we have just seen refers to its reputation in the treatment of scrofula we may mention the genus *Gratiola* derived from *gratia*, grace, in allusion to its usefulness in medicine. *Euphrasia* named for one of the Graces means delight

or cheerfulness and is applied to a genus of plants for their medicinal virtues. It is said that *Odontites* is an ancient plant-name derived from a Greek word meaning tooth and reputed to be good for the toothache. The plant which now bears the name, however, fails to live up to this reputation. Among medicinal plants, also, is probably to be included *Pedicularia* derived from a word meaning louse. Gray says the name has no obvious application but Wood states that the plant was formerly used against lice. An old belief is that this plant bred lice in sheep that happened to feed upon it. The reader will therefore choose the derivation that most strongly appeals to his fancy.

In several instances the flowers have suggested the names of the genera. In *Chelone*, for instance, the name is derived from a word meaning turtle and is given in allusion to the flowers, like a turtle's head. The open corolla of *Mimulus* suggested the grinning mouth of an ape, *mimo*, hence the diminutive name. The peculiar corolla of the snapdragon genus has given it the name of *Antirrhinum* from words meaning like and snout. In a similar way, *Rhinanthus* means snout and flower, the name referring to the beaked upper lip of a species once included in the genus. *Dasytoma* means hairy mouth and alludes to the hairs in the throat of the corolla. *Pentstemon* is the name of a genus of plants with five stamens in a group where four in the fashion. The fifth stamen, however, does not bear pollen and the plants may therefore be considered in good standing in the family.

According to Wood, the foxglove genus, *Digitalis*, is from *digitabulum*, a thimble. Another derivation says it is from a word from fingers or "belonging to the fingers" as the common name suggests. *Schizanthus* is from two Greek words meaning cut and flower and was applied to this genus in

allusion to the lacinate petals. *Calceolaria* is from *calceolus*, a slipper, which the sachate lower petal suggests. *Leptandra*, by which a section of *Veronica* is sometimes known, means slender stamens, these organs being quite conspicuous in the plants so named. *Micranthemum*, means, simply, small-flowered.

The genus *Veronica* is supposed to have been named for St. Veronica whose own name from *Vera icon* "true image" is connected with an interesting legend familiar to everybody. Whether the first *Veronica* was named because it bloomed on the day dedicated to the saint, or whether the plants, being medicinal, were under the protection of this saint, does not seem to be known.

Genera dedicated to less saintly personages are not uncommon in this family. *Seymeria* is for Henry Seymer an English naturalist, *Castilleja* is for the Spanish botanist Domingo Castillejo, *Buchnera* is for J. G. Buchner an early German botanist, *Collinsia* is for Zacheus Collins, an 18th century botanist of Philadelphia and *Schwalbea* is for C. G. Schwalbe an obscure German. The name *Gerardia* commemorates John Gerarde, the famous author of the "Great Herbal" issued about 1597, while *Pawlonia* is named for Anna Pawlona, a Russian princess, daughter of the Czar Paul I.

Peculiarities of the plants, other than the flowering parts have given names to such genera as *Linaria* where the reference is to the leaves like those of the flax (*Linum*). The mulleins have the very appropriate name of *Verbascum* which was originally *barbascum* from *barba* a beard. *Synthyris* is Greek for "doors closed" in allusion to the form of the seed capsule. *Orthocarpus* is the Latin for straight fruit and *Melampyrum* is Greek for "black wheat", the name said to have been given to these plants in allusion to the dark colored seeds of the species.

Two groups of little plants living in the mud have derived their generic names from their habitat. *Ilisanthes* is from *ilus*, mud, and *anthos*, a flower, while *Limosella* is from *linus*, mud, and a word for seat, the plants appearing as if sitting in the mud. *Herpestis*, a name formerly applied to a genus of plants now included in *Bacopa* is Greek for a creeper. *Bacopa* itself, is a South American word of unknown meaning and *Conobea*, the name given to a single small plant so inconspicuous as to have no common name, is from the same source.

The flowers of the Scrophulariaceae, like those of the Labiate, are nearly all strongly two-lipped with shapes that often suggest the heads of animals as such common names as "turtle head", "snapdragon", "rabbit-flower" and the like attest. It is worthy of note, however, that one section of the family has flowers so nearly regular as to seem an anomaly in the group and one has difficulty in harmonizing such species with his conception of the family. Aside from the flowers, however, the other characters of these particular plants conform to the styles for the family and no botanist has yet had the hardihood to attempt their exclusion. Of this latter group, the mullein is an excellent example.

Everybody knows the mullein (*Verbascum thapsus*). The white-woolly leaves and tall, thick flowering-spikes are familiar sights in widely separated parts of the North Temperate Zone and have naturally gained the species many common names. More than forty of these are known. They are mostly of European origin, since the plant originated on the other side of the Atlantic, and the majority are of obvious derivation. Among the most numerous are those referring to the woolly leaves, such as "velvet-dock", "candle-wick mullein", "Adam's flannel", "felt-wort", "hare's beard", "flannel leaf", "old man's flannel", "blanket-leaf", "flannel plant",

"velvet-plant", "ice-leaf", and "lucernaria". The last mentioned is from the Latin *lucerna*, a lamp, and, like "candle-wick mullein", alludes to the ancient use of the woolly leaves as wicks for lamps. By many the word "mullein", or "mullen" as it may be spelled, is derived from the same root as *wollen* and the word flannel is regarded as akin to it. After the leaves, the flower-spike is probably responsible for the greatest number of names in the vernacular. Among these may be noted "Jacob's-staff", Aaron's rod", "hag-taper", "hedge taper", "torches" and "shepherd's club". The name of "cows lungwort" and "bullock's lungwort" may have been given to the plant in the supposition that it is medicine for cows, but grazing animals rarely if ever eat it. The plant is also called "great mullein" to distinguish it from the lesser members of its genus.

Verbascum blattaria is the "moth mullein". The name is said to have been given the plant because moths visit it, but it is very apparent that the hairy purplish stamens and the soft white or yellowish corollas make the flower itself very like a moth and this is probably the correct interpretation of the name. The specific term is from *Blatta* the generic name of the cockroach and was given this plant under the entirely erroneous impression that it will repel the unwelcome insects mentioned. The specific name of *Verbascum lychnitis* is from the Greek *lychnos*, a lamp, and is still another allusion to the use of mullein leaves as lamp-wicks.

A companion of the mullein in old fields, and like it an immigrant from Europe, is the "toad-flax" (*Linaria vulgaris*). This species, however, has a rather more aristocratic lineage and appears to have been first imported for the flower-garden, but its vagabond ways soon made its room better than its company and it was turned out and obliged to consort with other

weeds less beautiful. The name "ranstead", or "ransted", which colloquial speech has corrupted to "rancid" is the name of its introducer, and is all that is left to it of the days when it was held in high repute. The bright yellow and orange of its blossoms are responsible for many of its common names such as "butter-and-eggs", "eggs-and-bacon", and "bread-and-butter". "Rabit ears", "rabbit flower", and "snapdragon" refers to the shape of the flowers and "Jacob's ladder" to the form of the inflorescence. The slender leaves, much like those of the flax, have suggested "flax-weed", "toad flax" and "yellow toad-flax". At first glance it is a mystery how the toad became connected with this plant, but it is said on good authority that the plant was originally called *bubonium* because used in curing an affliction known as *buboës*. Since *Bufo* is the technical name of the toad the similarity of sound made the transfer easy. Entirely inexplicable are "bride-weed", "bride-wort", "impudent lawyer" and "gall-weed" though the last two suggest some points of similarity.

Linaria cymbalaria is the familiar creeping plant known as "Kenilworth ivy". It has a number of other names of similar meaning such as "coliseum ivy", "Oxford-weed", ivy-weed", "ivy-leaved toad-flax", "wandering Jew", "mother-of-thousands", and "climbing" or "roving sailor". The name of "pennywort" probably refers to the shape of the leaves but this term, like several others applied to it, are general terms used for many other plants. Both *L. spuria* and *L. elatine* are called "cancer-root" without adequate reason. These plants also bear the name of "female fluellin" which appears to be a corruption of a Welsh phrase meaning "Llewellyn's herbs or plants". The particular Llewellyn referred to, is the Welsh Prince mentioned in the legend of the hound, Gellert.



NOTE *and* COMMENT



STRENUOUS PLANT IMPORTATION.—Importers of plants have not always had the Federal Horticultural Board to contend with, but the introduction of new plants in America has sometimes failed to be plain sailing for all that. Take the case of the mango, for instance. The introduction of this fruit into Jamiaca was quite unintentional, so far as the original importers were concerned. In 1782, a French ship bound from Mauritius to Hayti with a cargo of economic plants was captured by the English under Rodney and sent as a prize to Jamaica. Among the plants were cinnamon, Jack-fruit (*Artocarpus integrifolia*) and mangoes (*Mangifera Indica*). The mangoes were invoiced by number and the names having been lost the plants were referred to by the original numbers. "Number 11" turned out to be an especially well-flavored fruit and to this day it has so influenced opinion that any superior variety is sure to be called a "number eleven". About ten years after this importation Captain Bligh landed in Jamaica with several hundred plants of bread-fruit (*Artocarpus incisa*). The account of his adventures in securing these reads like a tale from the Arabian Nights. As Lieutenant Bligh, he left England in 1787 in command of the British ship *Bounty* for a trip to the Society Islands in quest of bread-fruit trees. He tried to sail around Cape Horn but hostile winds kept him back and he was obliged to make for Tahiti by way of the Cape of Good Hope. After taking on a cargo of a

thousand bread-fruit plants, he began the return voyage, but his sailors could not forget the beautiful Tahitians and about a month after sailing they mutinied. Bligh and eighteen of the men who had remained faithful to him were placed in an open boat and the ship sailed back to Tahiti where they took on a very different cargo and then sailed away again finally landing on Pitcairn Island in the Southern Pacific. In the meantime, Bligh and his party in the open boat made the trip of more than 4,000 miles across the Pacific and finally reached the Moluccas. Making his way to England, he was given command of a new ship and as Captain Bligh of the Ship *Providence* set out once more for Tahiti where he secured a new cargo and at last delivered it to its destination in Jamaica.

AMERICAN LEGION DAISY.—The American Legion has had the usual luck of those who attempt to adopt a representative flower that does not represent anything in particular. In the beginning the poppy of Flanders was most appropriately chosen, but later it was rejected because it was not a native American and because it was feared that it might become a weed if introduced into this country. As to the last mentioned objection, it may be said that the poppy has been cultivated for many years on this side without showing a tendency to spread from the garden. At the Legion's third national convention the "American Daisy" was adopted. Those who sponsored the claims of the daisy were careful to point out that the flower designated is not the daisy of Burns and Shakespeare, but their botanical knowledge, was apparently not extensive enough to apprise them of the fact that the "American" daisy is by origin an English plant, that it is a noxious weed in any country, and is detested by every cultivator of the soil. The sentimental may dignify it with the name of "Marguerite," but the farmer calls it plain "white-weed".

WHITE PINE BLISTER RUST.—The white pine blister rust (*Cronartium ribicola*) is a European fungus pest that became established in New England about twenty years ago. It is very destructive to the white pine (*Pinus strobus*) as well as to other pines with five needles in a bundle. It was hoped that it might be kept out of the West and Northwest where there are still extensive forests of western white pine (*P. monticola*) and sugar pine (*P. Lambertiana*), both susceptible species, but it has recently found a foothold in western British Columbia and Washington. When a pine tree is attacked, the fungus does not spread from it directly to other pines, but must first pass a certain stage of its life on the leaves of some species of currant or gooseberry. In making war on the pest, therefore, an attempt will be made to eradicate the species that transmit the disease to the pines, but since these shrubs are very numerous in the Northwest a long and strenuous contest is in prospect.

A WEEDLESS LAWN.—Those who dislike the annual labor of eradicating from the lawn dandelions, quack-grass, purslane, dock, and other interlopers, will be interested in a new method of lawn-making that obviates this performance. The idea originated at the Agricultural Experiment Station of the Rhode Island States College at Kingston, at least they have been able to maintain what amounts to a weedless lawn there for more than fifteen years. In an Extension Bulletin (No. 13) they tell us how it is done. It all goes back to the subject of acid and alkaline soils. It happens that the weedier the lawn, the likelier the soil is to be alkaline, or to turn the statement around, if you have an alkaline soil you are likely to have weeds. The weeds have so long fought the crops of alkaline soils that they have decided aversion to soils that are sour, but certain grasses have no objection to acidity and thus

we circumvent the weeds by making the soil sour and planting the grasses. All that is then needed is to keep the soil at a proper degree of acidity. The grasses recommended for such lawns are Rhode Island bent, creeping bent, velvet bent, red-top and Italian rye-grass. Most of these grasses are species of *Agrostis*, the first named being the most highly recommended. To produce the proper degree of acidity the soil is treated before planting with equal parts of ammonium sulphate, acid phosphate and muriate of potash, applied at the rate of about 3 ounces to the square foot or about 750 pounds to the acre. All lime should be avoided and clover, of course, will not grow in such soils. To keep the lawn in condition and prevent the weeds from pushing in, the same amount of fertilizer must be applied annually, early in spring, but most gardeners will regard this as worth the trouble. It is well to remember, however, that ordinary garden plants are not likely to thrive in such soil.

GARDENING IN ACID SOILS.—By this time it is probably pretty well known that the heaths, pitcher plants, orchids and the like that are commonly regarded as difficult to grow, are difficult only because they dislike alkaline soils. If the soil is made acid, they thrive without much care. Since there are an immense number of plants in the world that favor acid soils, and many of them produce most beautiful flowers, the problem of their cultivation is an important one. Dr. Bird has recently shown in these pages that artificial bogs for the cultivation of such plants may be made by simply watering the plants with a solution of tannic acid. Now F. V. Coville, a Government botanist has devised another scheme to make the soil acid, not so much by adding acid as by taking out the alkaline matter. By adding aluminum sulphate to the soil, the sulphur forms a new combination with the lime in it mak-

ing calcium sulphate which is thus rapidly leached out of the soil. In one case reported, rhododendrons treated with aluminum sulphate increased in size 250% more than untreated plants. If as encouraging results are obtained with other acid soil plants, we may expect our blueberries to attain unheard-of size and luxuriance, and trailing arbutus and the orchids to become a feature of all good gardens.

WHERE SNOW FALLS DEEPEST.—The greatest snowfall known in the United States occurs in the Sierra Nevada and Cascade Mountain ranges in the Pacific Coast States, where at some places from 30 to more than 40 feet of snow falls during the winter season, says the Weather Bureau of the United States Department of Agriculture. At Summit Calif., which has an elevation of about 7,000 feet, nearly 60 feet of snow have been recorded in a single season, and about 25 feet in a single month. Snow usually falls on more than 60 days of the year in northern New York, the upper peninsula of Michigan, northern Minnesota, and northern North Dakota, as well as in the higher elevations of the northern Rocky Mountains. Snow may be expected on as many as 30 days as far south as southeastern Pennsylvania, central Ohio, southern Wisconsin, and southern South Dakota, and on 10 days in southern Virginia, western North Carolina, the northern portions of Tennessee and Arkansas, central Oklahoma, and northwestern Texas. In extreme southern South Carolina, south-central Georgia, northern Alabama, and south central Texas, however, snow may be expected only on about one day during the winter.

SPEED OF BIRDS IN FLIGHT.—Certain species of hawks have a speed of 200 feet a second, or about 136 miles an hour, according to the U. S. Biological Survey. This might be a suitable rate for a racing airplane. The canvasback duck can

fly from 130 to 160 feet a second, but its usual rate of 60 to 70 miles an hour would be pretty fast to be enjoyable in a plane making a pleasure trip. The crow is the least rapid of a list of 22 migratory birds, flying an insignificant average of 45 feet a second, or 30 miles and hour. Of course this speed maintained steadily in an automobile would mean a very fair rate of progress, defying the speed laws in many communities. Most of the birds listed, however, do better than the crow. Curlews and jacksnipes can fly 55 and 65 feet a second, while quail, prairie chickens, and ruffed grouse can make 75 feet. The dove can reach a speed of 100 feet a second, or 68 miles an hour, although its usual rate is less. Redheads, blue-winged teals, green-winged teals, Canada geese, and different varieties of brant can fly over 100 feet per second, ranging in speed from 68 to 98 miles an hour, but usually fly at a much slower rate.

PLANTS AND ULTRA-VIOLET LIGHT.—An interesting series of experiments on the effect of ultra-violet light on plant life is being conducted at the Pennsylvania State College. It is reported that H. W. Popp, an instructor, has found, in preliminary tests, indications that the invisible rays in sunlight decrease the rate and amount of germination in soaked seeds, inhibit growth and development, and finally cause the death of the plants. In some varieties of plants, it was found that new leaves would not form under ultra-violet light, and in other cases it was found that, though the leaves formed, they were killed a day or two later. The ultra-violet light was produced by means of a mercury vapor arc. Various types of screens were used to eliminate the ultra-violet light from sunlight.

MAHONIA REPENS NOT GUILTY.—Another proof of Josh Billings's famous aphorism that "It is better to know less than

to know so much that aint so" is supplied by *Mahonia repens* which, because of its alliance with the barberries, was ostracised, some years ago, when certain young scientists were making a reputation by making war on the barberries. In some sections the common barberry (*Berberis vulgaris*) is a well-known carrier of one stage of a rust that is very destructive to wheat. In consequence it was decided to eradicate all barberries, whether in city or country. *Mahonia repens*, often called *Berberis repens*, naturally fell under the ban but the Federal Horticultural Board has now graciously permitted it to live and has pronounced it not guilty of harboring the rust. The unfortunate part of the affair is that this belated reinstatement will not bring back the plants dug up in a patriotic effort to help the Government stamp out a plant parasite that does not require the barberry in its young life but nevertheless lives on it when it gets the chance.

MARSH ELDER AND SUNFLOWERS.—I want to supplement my statements about *Iva Xanthifolia*. Never anywhere have I seen any weed spread and develop as this one has in Pocatello. Three years ago it could hardly be found and the few individuals that were hidden in out of the way nooks were so small and stunted as to be hardly recognizable. Last summer it was everywhere, especially abundant along the sidewalks and curbings of the vacant lots in the business district. While the great majority of the plants were still far below the height of this plant in the middle west, here and there one more lusty than its fellows, attained a height of five or six feet with large and heavy panicle that promises much for the future possession of the land. Where this weed grows abundantly Russian thistle and our native saltbush occur very sparingly but it will require further observation to determine whether it is supplanting them or only occupying

the territory they have not covered. It still sticks to the soil around town but I have seen a few small plants here and there along trails and streams in the hills that indicate its scouting activities. Sunflowers, too, are spreading so rapidly here that Kansas will have to go to planting sunflowers to keep up with us. Not only along ditch-banks, curbings and railroad tracks but everywhere in waste ground along the river, in dry-farmed fields, unbroken gulches and gravelly benches the ground is hidden by a blaze of yellow. There are two species of them *Helianthus lenticularis* and *H. aridus*. Generally speaking the former prefers the improved soil about town while the latter is more abundant on the raw soil of the hills but the two often grow together. Is this a hint from Nature as to the developement of a new product from our semi-arid tracts? "The old Oregon Trail across the prairies died in a blaze of sunflowers" but it has been born again west of the mountains, flanked with golden glory typical, not only of the lure that called the white man across their savage summits, but also of the wealth that is waiting for the application of work and wisdom—*Mrs M. E. Soth, Pocatello, Idaho.*

OWNERS OF COMPLETE SETS.—To the list of owners of complete sets of this magazine, may now be added the following:

65. Daniel Smiley, Mohonk Lake, N. Y.
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- 68 Wm. H. Lightfoote, Canandaigua, N. Y.

There are still left sets 69 to 90. Set 91 is owned by the editor and this completes the list. We have seven additional sets of Vols. 1 to 22 inclusive which can be used to complete sets of those whose subscriptions began as early as 1917 but

this is the absolute limit. Prices will naturally advance as our stock approaches the vanishing point. Those who contemplate owning a complete set should hesitate no longer.

CHINESE POTATO.—Those who patronize chop-suey establishments may have become acquainted with a curious vegetable known as Telinga potato or Chinese potato. It is not a potato nor closely related to the potato family, but it is nevertheless a very palatable vegetable, either raw or cooked. Examination of fresh specimens show them to be corms an inch or two in diameter that are produced by an araceous plant known as *Candarum potato*. The plant is cultivated in Eastern Asia and the fresh corms have a taste somewhat like chestnuts. In flavor they are much superior to the dasheen, another corm produced by a tropical species of Araceae.

BREAD FROM TEARS.—A species of grass often cultivated in old gardens for its hard grayish seeds is commonly known as Job's tears (*Coix lachryma-Jobi*). The seeds are frequently made into necklaces and have the special merit for this purpose of being perforated and ready to string. Nobody would think of using these hard bony objects for food, but a variety has been discovered in the Philippines in which the outer husk is so thin as to be easily milled and then can be made into flour from which a very palatable bread can be baked. The plant has yielded thirty bushels or more to the acre and can be profitably grown wherever rice can. It promises to be a valuable addition to the cereal crops of the warmer parts of the world. It is already used to some extent in the Philippines and is being introduced to new countries under the Philippine name of *Adlay*.

EDIBLE MORNING-GLORIES.—Although the sweet potato belongs to the morning-glory family, one does not commonly think of the family as a producer of edible species. A plant

recently sent from China by one of our Government's agricultural explorers, however, is recommended as a pot-herb the leaves and young stems being the parts used. The plant is semi-aquatic and the leaves that appear in market are gathered from plants grown on the borders of wet fields. It is reported that during June and July, loads of the young shoots are sent to market. The stems are about 18 inches long, hollow, and half an inch in diameter. These with the succulent leaves are cut up into a spinach-like food.

RATTLESNAKE PLANTAIN COLONIES.—It seems to be a rare thing for the little orchid known as rattlesnake plantain (*Goodyera pubescens*) to grow singly. Almost invariably they occur in close little colonies very conspicuous by reason of their white-veined and mottled leaves. The reason for these plants growing in companies seems to be that the young plants find the best conditions for growth near to the old plants and thus continue to renew or extend the original colony. This is quite contrary to the behavior of plants in general, for the seedlings seem to desire to get as far away from their place of origin as possible. In the orchid genus, however, the young plants have set up a partnership with a mycorrhizal fungus and are not able to thrive without it. In consequence they seldom find suitable places for growth at any great distance from the parent colony. The seeds of *Goodyera pubescens* lie on the soil all winter and sprout the following spring, but by the end of August they are often only a millimeter in length and lack chlorophyll, according to Oakes Ames, from whose article in *Rhodora*, we quote. The protocorms, as these small bodies are called, develop numerous long, slender, root-like processes known as rhizoids and then appear "like small white spiders at the center of miniature webs." The fungus enters the rhizoids and aids the young plant in making food by absorbing useful

material from the humus in the soil. At the beginning of the second spring, leaves and roots are produced and the young plant proceeds to grow up.

QUINCE FRUITS.—It is seldom that the descriptions of the technical botanist make a vivid impression on the mind. One would not recognize his best friend if described in the same way. When one has a plant in hand, it is very convenient to compare it, point by point, with the technical description, but for ordinary purposes this is not sufficient. Who that has read the description of the Japan quince, realizes that the fruits are five-angled like the well-known "delicious" apple, or that the core is much more roomy than that of the largest apples and fairly packed with seeds? It is a matter of common knowledge that the apple-like fruits consist partly of the ripened ovary and partly of the floral receptacle, now grown thick and juicy. In most pomes, as these fruits are called, one may distinguish in a general way between the receptacle and ovary, but in the Japan quince there is no doubt about it. When cooked, as in the process of making jelly, the receptacle comes apart along the five angles and spreads out like some new kind of flower in which the five divisions form the corolla with the ovary in the center. In size and shape they suggest the larger forms of earth-stars (*Geaster*). The core or ovary when ripe is quite firm and woody and very clearly indicates its relation to seed capsules in general.

SWEETER THAN SUGAR.—Under the title of this paragraph there was published in this magazine several years ago, a note on a South American plant whose leaves placed in the mouth gave the impression that they were much sweeter than sugar. The plant was formerly called *Eupatorium rebaudianum* but it is now sometimes placed in the closely allied genus *Stevia*. The principle that causes the sweet taste has been

found to be a glucoside and therefore not likely to compete with sugar in the markets of the world. The behavior of this plant, however is quite put into the shade by a member of the Sapotaceae named *Synsepalum dulciferum* from tropical Africa. This species has berry-like fruits resembling olives, which at maturity are dull red with a thin soft pulp. When this fruit is eaten it has the property of making even the most acid substances taste sweet and this peculiar effect is said to last for an entire day.

BACK NUMBERS WANTED.—Walter M. Buswell, Fort Myers, Fla., needs No. 2 of Vol. 25 and No. 2 of Vol. 27 to complete his set of this magazine and will pay cash, or exchange complete volumes for them. The Buffalo Society of Natural History, Public Library, Buffalo, N. Y., also wants No. 2 of Vol. 27. Mr. Madison Cooper, Calcium, N. Y., wants all of Volume 23 and offers any reasonable price for the numbers. Readers who happen to have extra copies of the numbers wanted will do a great favor by communicating with the persons mentioned. If there are any others who still need odd numbers to complete their files they should speak at once. It will soon be too late.



EDITORIAL



One of the things that is the matter with botany is the Academic Mind. An individual laboring under this handicap would much prefer data on the structure of fibro-vascular bundles, the nature of the nuclear spindle, the position of the chromosomes in karyokinesis, and the chemical composition of the anthocyanins than to have the run of the finest garden or park in the world. It is the academic mind that inclined botany teachers to require their classes to draw cross-sections of a pickled seaweed conceptacle with the aid of the compound microscope, when they might be observing the vegetation of field and wood or studying the insects that pollinate the flowers. The teacher with the academic mind does not subscribe to the botanical journals. He does not have to keep up with the advances in botany. His courses in plant study were cut and dried, especially dried, long ago and he means to keep them in that condition. But all this reacts unfavorably upon the flower-loving public which contributes the money for the upkeep of the schools and wants its children taught something about plants that they can use. Such questions as "What is the name of this plant?" "What is it good for?" How can you grow it?" Where does it grow?" "How can you multiply it?" "To what other plants is it related?" "Is it helpful or harmful?" are all too rarely heard in the school room. We know of at least one high school in a large city where agriculture is taught out of a book. Just imagine asking an able-bodied boy aching to get out into the soil on a spring day to stand up in class and describe plowing from the description

in the book! And think of the botany teacher who does not know the common plants of his own region and who never possessed a garden of his own! How can he teach botany of any significance? Is it any wonder that botany is slipping? What can we expect so long as the Academic Mind is in control; when the teacher of botany, rather than the botanist makes the course of study?

BOOKS AND WRITERS

Well, we suppose we shall have to mention the Editor's new book first. * * * "American Plant Names" is the title though it covers only the plants of North-eastern America. * * * Three parts have been issued and another is nearly ready. * * * There are about six thousand names in the first hundred pages. * * * It is a German sort of a book in which the author records the facts, whether they mean anything or not. * * * But it will be invaluable for reference, the Editor says. * * * Now that is off our mind. * * * Looks as if the new year would be a good one for botany, so many new magazines are springing up, or about to spring. * * * The most ambitious undertaking is the 64-page *Nature Magazine* announced from Washington. * * * You probably received a copy of the prospectus. * * * Yes, everybody did! * * * The *National Horticultural Magazine* has already issued two or three numbers. * * * Hamilton Traub, secretary of the National Horticulture Society is editor. * * * The society wants more members. * * * Its office is at Henning Minn. * * * We hear that Eva Kenworthy Gray is publishing the *Flower Journal*. * * * Two numbers are reported to be out but we have not seen them. * * * All this activity

is good for botany. * * * We need more magazines and more botanists. * * * Something ought to be done about it! * * * Luther Burbank writes to one of our contemporaries that "I know of no other horticulture magazine published anywhere that is so well edited and so generally interesting." * * * Bless your heart, Luther, you are going to see one just as soon as this is off the press! * * * "Every day and in every way we are getting better and better." * * * C. A. Weatherby says that somebody has been pirating the *Fern Bulletin*. * * * A reprint of Vol. 1. No. 1, has been discovered. * * * If anybody knows who did it, we wish they would let us know too. * * * No we don't intend to reprove him. * * * We think just as much of the *Fern Bulletin* as he does. * * * Wish he would reprint several other numbers. * * * They are as scarce as cardinal flowers in January. * * * That reminds us that the Editor is going to bring out a new edition of his "Fern Allies of North America." * * * This is positively its last appearance, * * * The plates are to be melted up. * * * Get ready to order your copy. * * * R. C. Benedict says there ought to be game laws for ferns and rare flowering plants. * * * His observations on the subject, reprinted from *American Fern Journal*, are being distributed by the Brooklyn Botanic Garden and the Fern Society. * * * Vermont has protected her territory from the hand of the spoiler by enacting a law to prohibit picking flowers and uprooting plants. * * * Other States are expected to follow this example. * * * The subject of Dr. L. H. Bailey's second number of "Gentes Herbarium" might well be "Too Much Mustard!" * * * In a scholarly paper he has tried to separate the cultivated forms of *Brassica* or *Sinapis* or whatever else you may call them.

* * * Think of all the varieties of cabbage, kale, broccoli cauliflower, collards and brussels sprouts belonging to a single species! * * * And the kohl-rabi and turnip almost squeezed in! * * * Pe Tsai, the so-called "celery cabbage" is identified as *Brassica pekineisis*. * * * After this the mustards will stay on their own side of the fence.

* * * Dr. Aven Nelson has resumed his position as head of botany in the University of Wyoming after serving five years as President of the institution. * * * The West is fond of making University presidents out of its botanists; Dr. Bessey served in this capacity in the University of Nebraska. * * * We like to see eminent scientists at the head of large institutions but good botanists are too rare to be used as mere college presidents. * * * We are glad to see Dr. Nelson back in his old position. * * * The botany of the Rocky Mountain region will now get a new impetus. * * * In appreciation of his services, Dr. Nelson was given a three month's leave of absence. * * * He is spending this in California. * * * "Pettiford's fern" illustrated in the *American Botanist* for last August was awarded a silver medal at the 94th annual show of the Pennsylvania Horticultural Society. * * * It is *Aspidium laserpetifolium* from Asia. * * * But no longer a foreigner; it has been naturalized near Philadelphia. * * * The *Independent Gazette* of Germantown reprinted the article from this journal. * * * W. R. Maxon sends us a copy of his "Botanical Gardens of Jamaica". * * * It is reprinted from the "Smithsonian Report" for 1920. * * * Well, we have been in all of them and they are just as he says they are. * * * Twenty fine plates accompany the text. * * * Makes one want to explore the Blue Mountains again. * * * *Hinc illae lachrymae*.

The long-expected "Fern Lovers Companion" by George Henry Tilton has at last appeared. It is a fine little book of some 238 pages in which are treated all the ferns of that region commonly known as the Northeastern States but which by common consent for floral purposes goes west to the Great Plains and South to the mountains of Kentucky and Tennessee. The book is very well printed and fully illustrated the illustrations for the most part being from ferns in the author's collection, but other sources have been drawn upon, such as the Davenport Herbarium and various fern-books now out of print. The ferns are discussed in related groups the text devoting two paragraphs to each species, the first of a technical nature and the second more popular. There is a list of American and foreign fern literature, a glossary, a list of the species discussed with their synonymy, and directions for studying ferns. The book is a most attractive addition to our fast disappearing fern literature and will undoubtedly meet with a warm welcome from students of ferns. It is published by the author at Melrose, Mass.

At first thought it might be hastily assumed that all the different kinds of garden-books have been written, but Ella M. Freeman has shown otherwise in her "Home Vegetable Garden.". If one who knows all about gardening should walk about her grounds and comment on each kind of vegetable as she came to it, and later set all this down in a book it would probably be very much like the one before us. It is no made-to-order volume; the author undoubtedly wrote it for the sheer delight of telling about her plants. The book is full of information from cover to cover, but it is not of the seed-catalog variety. It reads a good deal more like an essay. In spite of this, or because of it, each vegetable is thoroughly discussed from seed-sowing to the table or the storage-cellars.

Anybody who enjoys a good garden will be pleased with this book. It is number 2 of a new "Open Country Series" under the editorship of L. H. Bailey who has himself written the initial volume on "The Apple-tree." Two other volumes, "The Cow" and "Vacation on the Trail" have also appeared. The price of the present volume is \$1.75.

Along the western side of India, south of the tropic of Capricorn, there is a stretch of country known as the Bombay Presidency, whose ferns form the subject of an attractive little volume by E. Blatter and J. F. d'Almeida, professors of botany in St. Xavier's College, Bombay. "The Ferns of Bombay" is a book designed to advance the study of the ferns in the Presidency by providing means for their identification. In the beginning, the terms used in describing ferns are defined, and the distribution of the different species discussed. The bulk of the book, more than 200 pages, is devoted to technical descriptions of the species. There is a synopsis of the genera and various keys to the species, but this feature is not as conspicuous as it might be. Owing to the great diversity of surface, the rainfall of Bombay is very uneven. Some portions are so arid as to approach desert conditions, while others are moist enough to support an evergreen rain-forest. There are however, fewer than a hundred species of ferns known. In spite of the great distance that separates us from Bombay, we note a number of familiar species in its flora. Among these are the bracken (*Pteris aquilina*), the lady fern (*Asplenium filix-foemina*), the adders tongue (*Ophioglossum vulgare*), the rattlesnake fern (*Botrychium Virginianum*), the venus'-hair fern (*Adiantum capillus-veneris*), the royal fern (*Osmunda regalis*), the marsh fern (*Nephrodium thelypteris*), and the holly fern (*Polystichum aculeatum*). Many others are common in the American tropics including *Pteris*

longifolia, *Adiantum tenerum*, *Blechnum occidentale*, *Nephrodium molle* and *Acrosticum aureum*. The well-known *Gymnogramme calamelanos* has become naturalized in Bombay. The book is well illustrated and well printed. It is issued by D. B. Taraporevala Sons & Co., Bombay, and costs 7 Rupees and 8 Annas.

In early April, the first flowers to greet the searching eyes were those of the *Anemone hepatica* or liver-leaf, which blooming at Easter were once named *Paas-blumtje*. Cousin-german to the European pasque flower, it is, with its evergreen leaves and persistent vitality, a better symbol of the resurrection, and more perhaps than any other of our wildflowers gives the welcome sense of quickened life in the woods and fields. Nestled among the branching roots of a great tree, or in the crevices of a rock, from among the cluster of last year's leaves —three lobed leaves of an ivy-green and purplish crimson underneath—rise a dozen slender stems wrapped in silken hairs; and from the furry involucre delicate in texture and tint as the silvery-tipped paws of a Maltese kitten, open to meet the sunshine glad flowers of every shade from hyacinthine purple to the windflower's rose-flushed pallor. Their fragrance is a subtle aroma distilled in the waiting buds by the first warm breezes and tells of fresh running sap, of bursting leafbuds and swaying catkins. It is the breath of the April days; Nature has awokened; the Lord is risen!—MARTHA B. FLINT.



MAGNOLIA GRANDIFLORA



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*Skirting the rocks at the forest's edge
With a running flame from ledge to ledge,
Or swaying deeper in shadowy glooms,
A smouldering fire in her dusky blooms;
Bronzed and molded by wind and sun
Maddening, gladdening every one
With gipsy beauty full and fine,
Gracefully blossoms the columbine.*

THE FLOWERS OF THE MAGNOLIA

By WILLARD N. CLUTE

IT is well known that not only plant families but lesser groups are based largely upon the structure of the flower. We are quite accustomed to refer plants with lilylike flowers to the Liliaceae, those with roselike flowers to the Rosaceae, and so on, but we run some risk of overlooking the fact that there are other features of the flower that are quite as characteristic and striking. Take size, for instance. There seems to be no reason why different species in the same family should keep within definite limits as to size and yet there are whole plant groups that are distinguished almost as much by the size of the flowers as by any other feature. The Umbelliferae almost without exception have very small flowers that are conspicuous only because massed and the flowers of Cruciferae, though much larger are still so small that taken singly few are noted for their beauty.

It is quite otherwise with that great alliance known to the botanist as the Ranales. Besides the Ranunculaceae, or buttercup family, for which it is named, it includes the Anonaceae or custard apples, the Nymphaeaceae or water-lilies, the Magnoliaceae and various other groups noted for the size of individual blossoms. We have only to call to mind the peony, pawpaw, May-apple, clematis and water-lily, to realize this; in fact, with few exceptions, the largest flowers in the world are found in this group. The blossoms of the Amazon water-lily (*Victoria regia*) are often more than twelve inches in diameter and even in our own part of the world the yellow nelumbo may reach the size of a quart bowl. The magnolias which, in the Western Hemisphere occupy the region between the plants just mentioned, have flowers quite in keeping with theirs. The flowers of the more hardy northern species often approach those of nelumbo in size while *Magnolia grandiflora* of the South, the species which always comes first to mind when magnolias are mentioned, occasionally reaches the dimensions of the great water-lily itself.

Magnolia blossoms however, have other claims to our attention, besides those of mere size. They are among the most beautiful of single flowers with thick, waxy, petals that form a substantial cup from which a pleasing perfume is poured. The structure of the flower is also of interest. Among other things it shows the magnolia family to be pretty well down in the list as plant relationships go. Indeed, certain characteristics, such as the stamens and carpels arranged in spirals instead of cycles, suggest a derivation from some pine-like ancestor. The petals and sepals also fail to conform to the standards set for higher types of flowers and seem quite undecided as to their affinities. Instead of adopting the five-parted arrangement characteristic of dicotyledons,

they show a tendency toward the monocotyledon number of three. By many this is taken as evidence of the relationship of the magnolias to the monocotyledons and to indicate that the latter group may have taken its origin from this section of the plant world. In fact, the water-lilies, which have similar characteristics, are often considered true monocotyledons.

The ripened ovaries of the magnolias cling together in oblong masses much like cones in appearance and again suggest a relationship to the pines. To others the fruits have suggested young cucumbers and several species are called cucumber trees on this account. The carpels at maturity open and disclose one or two seeds covered with brilliant scarlet arils, much like the fruits of the bittersweet (*Celastrus*). Unlike the bittersweet, however, the seeds when they leave the carpels, do not immediately fall to the ground, but hang for some days suspended by short silken threads which appear to be a part of the seed-stalk. Thus embellished the cones of fruit take on a new beauty.

The illustration for our frontispiece was made from a photograph of a flower of *Magnolia grandiflora* taken in Florida by Mr. Walter M. Buswell, of Fort Myers and kindly loaned for the purpose.

FLORA OF POCATELLO, IDAHO

By BLANCHE H. SOTH.

POCATELLO, Idaho, is situated almost at the mouth of the valley where the Port Neuf river emerges from the hills on its way to the Snake. The higher hills about the town are the northernmost bluffs and outposts of the Wahsatch range—among the oldest elevations of land on the continent. Briefly and very generally, three geological periods are recorded by (1) the mature hills west of town of which Kimball Peak is the highest point overlooking the valley, (2) the nearly level benchland in front of them and a hundred feet or more above the present level of the river and (3), due to a comparatively recent elevation, the cutting of the face of the bench into a series of shallow gulches and a few deeper narrow canyons. During the period of subsidence at the end of the glacial epoch an arm of great Salt Lake drained by way of Red Rock Pass through the Port Neuf valley into the Snake river. At that time huge deposits of sand, gravel and clay were dumped into the valley. The lower sand hills east of town are of this heterogeneous material. No doubt with them were carried the roots and seeds of the desert plants which today grow upon them but whose center of distribution is much farther to the south.

On the west, Mink Creek, City Creek and Trail Creek come down from the hills through narrow canyons which they have cut across the bench. Several miles south, Rabbit Creek comes into the valley from the older broken country to the southeast. Pocatello Creek meanders about the east-

ern base of the sand hills east of town until it sinks away in the loose deposits. Spring Creek and Michaud Creek are farther to the northwest, the fish hatchery is near the mouth of the former. Mt. Putnam some fifteen miles northeast is a point of interest much frequented. The hills west of town have a rich and varied flora due to their older, richer soil and their protection from the drying chilling southwest wind which sweeps the inter-mountain country so constantly. The sand hills east of town exhibit many patches of desert vegetation characterized by some species not recorded from any other point so far north but nowhere upon them are there any great number of species. The native flora along the river has been almost obliterated especially within the city limits. Necessary embankments have destroyed much of it, other places, subject to yearly overflow, have filled up with a great variety of introduced weeds which are rapidly spreading and crowding out the native plants even in those areas which have not been disturbed.

Pocatello has an altitude of 4,500 feet while Kimport Peak is approximately 7,000 feet above sea level. The flora of the valley as a whole is Transitional. Patches of pure Sonoran (upper) vegetation occur on the sand hills. The Canadian zone appears toward the summits of the higher hills and extends well down in places along the creeks and in the deeper moister gulches. The flora of this part of Idaho is closely related to that of the Wahsatch region, many of the desert species probably having been carried here in the manner above indicated, while the great Snake River valley has always acted as a barrier to the migration of plants from the north.

The rapidity with which introduced weeds are crowding out the native flora is worthy of note. *Bromus tectorum*

has almost entirely replaced the native bunch grasses. Extensive patches of *Salsola pestifer* in late September give a characteristic ruddy glow that alternates with the blaze of rabbit-brush (*Chrysothamnus*) up and down the slopes of the entire valley. It is remarkable how many weeds from the Old World are spreading here and how few of the native plants resist intrusion and become weeds. Among the most striking examples of the former are *Lepidium perfoliatum*, *Cheirinia repanda* and *Atriplex laciniata*, this last not recorded from any other place in the United States. The planting of European sugar beet and grain seed in many places west of the mountains easily accounts for the presence of the first two while the last seems to be closely connected with the large European population of Pocatello.

The seasonal aspects may be divided into pre-vernal, vernal, early aestival, late aestival and autumnal.

The pre-vernal aspect covers the time from the beginning of plant growth to about the end of April. During this period the grass becomes green, the buds of the trees swell and burst, and pussy-willows, and such other tree blossoms as appear before the leaves, expand. Buds and young shoots of *Artemisia* and *Chrysothamus* soften and afford good browsing for hungry herds. The bristly points of *Phlox* and other pungent-leaved perennials become tender. Basal rosettes of such plants as *Arabis*, *Senecio*, and *Cheirinia* are conspicuous and succulent tufts of larkspur as well as the tender green shoots of poison sego offer dangerous temptations to hungry animals. A very few herbs flower at this season. (*Fritillaria pudica*, *Phelopterus Utahensis*, *Cogswellia Jonesii* and *Microsteris micrantha*). The last mentioned is the earliest. I have found it in bloom March seventeenth on the grassy slopes below the cedars when scarcely an inch high.

A copious shower or two about this time will usher in the vernal aspect which covers the month of May. Moisture rather than temperature determines this aspect. If rain falls a host of perennial desert herbs come quickly into bloom upon the sand hills and the gravelly slopes and gulches of the bench-land. Among the first to bloom are lungwort *Mertensia lanceolata* and *Astragalus purshii*. Shrubs like golden currant (*Ribes aureum*) and service-berry (*Amelanchier florida*) bloom at this season and add their fragrance to the color of the lower forms. This aspect is the glory of the year for the lower hills but the gulches higher up about Kimport peak are still burdened with deep accumulations of snow. However, if the rain fails the flowers are fewer and less conspicuous, many plants fail to bloom at all or are delayed far beyond their usual season. Some will even bloom in autumn if rain follows an unusually dry spring. Always these early flowers mature quickly and the above ground parts disappear before the true summer flora of the higher hills appears.

The month of June approximates the early aestival aspect. It is the "high tide of the year" for the valley as a whole. The snow banks upon the higher hills melt rapidly and every little depression cradles a rippling streamlet. Some of this water finds its way into the creeks, filling them to overflowing and their banks and meadows teem with life and color. Much more of this water, however, sinks into the loose, gravelly soil to reappear further down in springs or at least in available moisture that nourishes groves of maple and dense, extensive beds of flowers. Trees are in full leaf. Some flowers of the vernal aspect persist in sheltered gulches and large numbers of seedlings come into bloom. Purple mists of *Pentstemon* drift away like smoke from the blaze of great patches of *Helianthella*. Closer examination shows that these natural gar-

dens support a dense growth of *Eriogonum*, *Yarrow*, *Geranium*, *Erigeron* and *Balsamorrhiza* with wild rose and dogwood along the creeks, sego stars in the sagebrush, pink buttercups and balm among the rocks on the summits. Why care whether corn and cabbages are growing in the town?

By the fourth of July the ruddy sheen of the ripened June grass has replaced the floral display upon the lower slopes of the valley and proclaimed the advent of the late aestival period. The available moisture of the soil has disappeared. It is hot, arid and dusty. Dense growths of pestiferous weeds are beginning to excite the maledictions of property owners and sufferers from hay fever. But plants as well as men find agreeable haunts in the high wooded hollows along the headwaters of the creeks. Fragrant mint and yarrow, the sweet blue eyes of grass and speedwell, and flames of monkey-flower and painted tip are in the meadows. Ragwort and monk's-hood strive to overtop the shrubs. Currants, chokecherries and service-berries hang ripe for the taking. Apparently this is the end of the floral year. But by the middle of August sunflowers are everywhere in great patches and in long golden trails in every direction. The grasses are sere and brown but the green clumps of rabbit-brush and grease-wood and the gray blur of the various kinds of "sage" are becoming increasingly conspicuous. Water in the reservoirs and ditches is getting dangerously low. We are praying for rain.

At last it comes and with it the autumn blaze, the halcyon time of all the year for all the great dry lands of the west. The torchweed's glow gilds all the gulches. Great fields of rabbit-brush afire with bloom stretch endlessly with here and there amongst them the ruddy embers of patches of Russian thistle. Crimson tongues of maple on the hillsides, spurts of

cotton-wood blaze on the creek banks, smoky sheen of sage and shad-scales on the flats, desert haze in the distance but desert sunshine all around, the coming winter has no power to chill until the last faint glow of this autumn fire has flickered out in late November.

BOTANY FOR BEGINNERS—VI

By WILLARD N. CLUTE

IN that part of America which lies north of the Ohio River and east of the Mississippi there are about four thousand different kinds of flowering plants and incidentally most of the botanists. Owing to the greatly diversified surface of the region the plant population varies with the locality, each species thriving in the situations best suited to its needs and being rare or absent altogether in less hospitable places. Moreover, there are other differences in the flora that may be ascribed to the effects of migration. Prairie species push in from the west, southern species crowd up along the Atlantic coast and plants from the north invade the mountain summits. Why the botanists are most numerous in this region has never been settled, but the fact that they are here most abundant certainly accounts for the fact that a majority of the books on plants issued address themselves to this audience.

A few plants are so tolerant of differences in soil and climate that they have a range almost as wide as the region, but with the exception of these the flora of one place is likely to differ considerably from that of another though separated from it by a comparatively short distance. In any locality, however, the botanizer may hope to find at least a thousand different species within a day's ramble of his home, the exact

number depending somewhat on the topography of the place. In beginning, however, the student is usually far more interested in finding out the names of his specimens than he is in tracing their ranges or ascertaining their exact number. Without a name one is helpless, unable to indicate his plant intelligibly to his friends or to look up its history in the books. He may, it is true, make a pretty close guess at its identity from its resemblances to some better known plant, but even here appearances are often deceptive and he still lacks that exactness of identification so dear to the hearts of all real plant students.

In such a dilemma, he finds himself in a position to sympathize with those early botanists who with only the crudest of books at hand were confronted, not only with a host of strange plants, but with a multitude without names at all. The way in which they evolved order out of this chaos makes a most interesting chapter in botany but can be only touched upon here. At first the best scheme that could be thought of was to describe the species as carefully as might be but this left no way of mentioning them except by the use of this series of descriptive terms. It was the Swedish botanist Linnaeus who devised the scheme of giving each plant a name of only two words, the first standing for the group to which it belongs and the second its own specific name.

All this, however, presupposes some idea of relationship among plants for until such ideas existed there could not be a group name. The idea that plants are really related and that their resemblances are not purely fortuitous, came very slowly; in fact external appearances were first relied upon to indicate relationship and it was a long time before the flower was recognized at the least changing of plant parts and therefore likely to give the most satisfactory characters for grouping

them. Until real relationships were recognized, therefore, plants had to be classified as edible, poisonous, medicinal and the like. A somewhat better classification was that which divided the plants into trees, shrubs, herbs and lianas or woody vines. Indeed, this classification is still used by nurserymen and seedmen and serves their purpose fairly well. It does not, however, always bring like species together and is therefore anything but scientific.

But even when the plants were properly catalogued there still existed the difficulty of finding the name of an unknown plant. This difficulty was also solved in a measure by Linnaeus, who devised a sort of botanical index or "key" by which a given species might be traced through the maze of plants. By dividing the plants into groups according to the number of stamens they produced, and then subdividing these groups according to the number of carpels possessed, he made divisions small enough to make it reasonably certain that one might soon locate his species. That this was an artificial system was recognized by everybody, but until the affinities of plants were understood it served the purpose. The keys that now are a part of every popular guide to the plants are often highly artificial, the sole object of course being to produce the name of the plant without undue labor or loss of time.

The object of scientific classification however, it to place like species together in a natural grouping and the keys in technical manuals are nearly always based on this arrangement. In some cases both natural and artificial keys stand side by side. The beginner finds the artificial keys easier at first because they seize upon the most obvious characters for distinguishing the species, but the natural keys give more fundamental differences.

Of the botanical manuals most commonly used, Britton's

has by far the more satisfactory keys, but it is open to the objection that it inclines to make species of every slight difference and the nomenclature employed is one that is discredited by the rest of the world. Gray's manual is much more conservative as to the species and uses the standard nomenclature, but the keys are often very unsatisfactory, being perhaps scattered through the text, or divided into many different sections, any one of which may lead the unwary astray. In Gray's book too, the distinguishing characteristics are italicised in the text, while in Britton's such characters are found in the key. In general one finds that first one key and then the other is more useful and in many cases one book may supplement the other. It might be asked why we should use such keys at all, since the popular handbooks have artificial keys which often trace the species with less labor. The reply, of course, is that the popular handbooks contain only the more showy species and when we are investigating little known plants or closely resembling species, a more exact set of descriptions are needed. So one might as well learn to use the technical keys in the first place.

The general framework of the natural system for identifying plants is very easily understood. The entire plant world is first divided into a number of groups and these are then subdivided according to relationship which is, of course, according to the descent. All those in a single group may be assumed to have had a common ancestor and naturally resemble one another more than they resemble those of other groups. A common method of making the first division is to make four groups. These in the order of their complexity are the Thallophytes (algae and fungi), the Bryophytes (mosses and liverworts), the Pteridophytes (ferns and their allies), and the Spermatophytes (seed-bearing plants). Mod-

ern systematists sometimes make as many as sixteen primary divisions but this adds nothing of interest to the beginner. The usual division of the Spermatophytes is into the Gymnosperms or cone-bearing trees and the Angiosperms or true flowering plants. In other systems of classification these are occasionally given equal rank as primary divisions and known as Strobilophyta and Anthophyta, respectively. Each of the main divisions of plants have entire volumes devoted to cataloguing their species, but books on the flowering plants are naturally more numerous than all the others put together.

VITALITY OF CANNA SEEDS

By J. FORD SEMPERS

THOSE who have planted the seeds of the garden canna have doubtless noticed the hard, shell-like covering apparently hermetically enveloping the seed. Years ago when the plant was more conspicuous for its foliage than for its blossoms it was sometimes known as shot-plant, a name suggested of course by the hard round seeds it bore.

Gardeners are accustomed to resort to some mechanical means of puncturing this impervious outer covering that the elements necessary to germination may be more readily admitted. This is sometimes accomplished by cutting through the outer covering with a file or emery wheel, but to be more practical the seeds may be placed in a test tube or some similar container and covered with boiling water. A pronounced popping sound follows which indicates the rupturing of the shell like covering. The brief application of high temperature does not appear to affect the vitality of the seeds, but occasionally there will be a few that resist its action. It is

from the somewhat unlooked for behavior of a stray exception or two of this kind, accidentally found that the following peculiarities have been noted.

I perhaps would not have been any the wiser but for the presence of a large pile of sandy soil that had been lying near an out building since the autumn of 1901. It had been placed there with the intention of grading about the building and was composed enterely of discarded seed tests made at that time. The material was not used as had been expected and the pile remained undisturbed. No additions were ever made to it in the intervening years. On its north side a sturdy honeylocust, (*Gleditsia triacanthos*) twenty feet high and ten inches in diameter, marked the spot where an ungerminated seed had been thrown along with other test refuse that accumulated at the time. The pile contained the remains of the average assortment of seeds to be found in a modern seedsman's catalogue besides those of many deciduous and coniferous trees, and the spores of cultivated ferns.

In later years I sometimes used this sandy soil in potting plants and was astonished at the persistence of so many seed coats that had undergone little or no change in appearance. Eleven years afterwards, (1912) the remains of curcurbit seed coats were conspicuous so that one could readily identify those belonging to gourds, squashes, pumpkins, and melons. In addition there were others, chiefly those of asparagus, beets, onions, okra, spinach and water vetches. I also found in my sieve at this date, three carna seeds that to all external appearances were uninjured. One I cracked open, finding the seed in apparently normal condition. The other two were placed in a germinator and in a very few days both burst into growth. They were late planted out and developed into large hardy plants; each bearing a large

raceme, the flowers of one being a deep red while those of the other were equally brilliant, but yellow.

In the autumn of 1917 another canna seed was sifted from the sand pile along with a much reduced showing of seed remains; in fact the only other distinguishable seed coats were a few cucurbits, spinach and one each of Martynia and winter vetch. The canna seed, having a rather rough and dingy appearance was promptly germinated in a flower pot. With the approach of frost the young plant was taken indoors. The following winter being a severe one the entire plant was killed above the surface of the soil though uninjured below. Early the next spring a new growth appeared and after all danger of frost had passed the plant was set out in the open. By early autumn it had made a rank growth and bore large deep yellow blossoms.

The time required to obliterate traces of the seed coats was undoubtedly extended by their being buried in a pile above the surrounding surface from which all surplus water could easily drain, yet the mound retained sufficient moisture to support a heavy growth of grasses. In winter it was repeatedly frozen as hard as a rock during zero weather for perhaps a foot from the surface. It is rather remarkable that the canna seeds would have excluded moisture for so long a time, thus preserving the vital parts against injury.

Objection perhaps to the supposition that the canna seeds found, had remained buried for so long a time may be made on the ground that seeds from recently discarded tests could have been carried and deposited in the sand pile by some burrowing rodent. There is not much on which to support such an objection since the sand tests made in 1901 were discontinued at that time and were followed in the intervening years by an entirely different and cheaper method of

testing in which the refuse was destroyed instead of being dumped in a pile to spread possible fungus infection. No canna plants were grown on the place ,with the exception of the two mentioned, from seeds found in 1912 and none were grown on adjoining premises.

An interesting, but lengthy experiment might be made with canna seeds by packing them in sand, using some kind of indestructible container such as a perforated concrete box that would exclude underground trespassers but allow a free circulation of moisture in the box. The seeds should be so arranged that each would be separated from its neighbor by an intervening layer of sand. The contrivance could then be buried and a part of the seeds tested for germination at intervals of five or ten years. Such an experiment would very likely show whether the peculiarities related above are constant or just mere freaks.

PLANT NAMES AND THEIR MEANINGS—XV SCROPHULARIACEAE

By WILLARD N. CLUTE.

SO like the toad-flax in appearance as to be joint owner of some of the common names in the "snapdragon" (*Antirrhinum majus*). The first syllable in the name is assumed by many to refer to the way the corolla opens and shuts or "snaps" when pressed in just the right way, but Britten and Holland assert that the name is really *sneb dragon* which is literally "dragon's snout". It will not do, however, to jump to the hasty conclusion that the common name refers to the flower. An examination of a ripe seed-pod will disclose a truly dragonlike countenance with staring eyes, a broad mouth, and a long snout. It is quite possible that this is the dragon's snout

meant. Other names for the plant are "lion's snap", and "lion's—" "tiger's—" "dog's—" "toad's—" "calf's—" "rabbit's—" and "dragon's—" mouth". "Bunny rabbits" and "bull dogs" are but other names of similar reference.

A fine little plant with flowers suggesting the head of an animal is *Chelone glabra*, commonly known as "turtle-head" but also called "snake-head", "cod-head", "fish-mouth" and "turtlebloom". The name of "shell flower" is quite as appropriate but this term is usually applied to an allied garden plant. An old name for our species is "balmony" a corruption of "bald mony" derived in turn from *baldemoïn* which is of obscure origin. The terms "bitter weed" and "salt-rheum weed" allude to real medicinal virtues.

The genus *Scrophularia*, from which the family takes its name is represented on both sides of the Atlantic by plants so nearly identical in appearance that for a long time our plant was regarded as a variety of the other. The European plant, *Scrophularia nodosa*, is the one to which all the common names really belong, though our plant (*S. marilandica*) shares them. The leaves have certain medicinal virtues as the common name "heal-all" indicates and it is probable that the use of the plant in the cure of certain fig-shaped tumors gave to the genus its best-known common name and to the family the appellation in the vernacular by which it is universally recognized. The name "scrofula-plant", like the generic term, alludes to the reputation of the plant in the cure of other ills and "pile-wort" is of the same nature. "Carpenter's square", is a misapplication of a name that seems by rights to belong to one of the mints (*Prunella*).

Another member of the Scrophlariaceae of European extraction, has the distinction of possessing more than sixty common names, which is probably the record in this respect. The

plant is the well-known "foxglove" (*Digitalis purpurea*). It has always been more or less of a question whether the name is derived from the fox or from the fairies (folks). The bulk of the evidence seems to be in favor of the fairies as witness such names as "folk's-glove", "fairy's-glove", "fairy-bells", "fairy-cap" and "fairy-thimbles". Variations on the thimble idea are "witches thimbles", "lady's thimbles", or simply "thimbles". It may be observed that the flowers are more like thimbles than gloves as the generic name suggests. Common names that recall those given the snapdragon are "rabbit-flower", "lion's mouth", and "throatwort". The name of "pop-dock" probably refers to the mild explosions made by the corollas when suddenly compressed.

Certain other plants closely related to the species just mentioned are sometimes placed in the genus *Gerardia* and sometimes in *Dasytoma*. The yellow flowers are sufficiently like foxglove blossoms in shape to be given the same common name though it is customary to prefix this with "false" to indicate the difference. *Gerardia flava* is the "yellow foxglove" or "downy false foxglove" and *Gerardia Virginica* is the "smooth false foxglove" or "golden oak". The last mentioned name refers both to the flowers and the oaklike leaves. *Gerardia pedicularis* has accumulated a larger number of common names. It is called "yellow gerardia", "bushy gerardia", "lousewort" and "fever-weed". With reference to the divided leaves it is called "fern-leaved false foxglove" and "lousewort false foxglove". The "lousewort" part of the name comes from the fact that the leaves are very much like the leaves of the true "lousewort" (*Pedicularis*) in appearance. In recent years this genus has received still another change of names and by some botanists is now known as *Agalinis*. When the change was made the common names of the plants were promptly

changed to "yellow agalinis", "fern-leaved agalinis" etc, in this showing how uncommon a common name may become. All the other species of *Gerardia* are so universally called by the generic name that this has virtually become a common name as well. *Gerardia maritima* is further distinguished by the names "seaside gerardia" and "salt marsh gerardia". The woolly-leaved *Seymeria macrophylla* is sometimes known as "mullein false foxglove".

The numerous species of *Veronica* are reputed to derive their names of "speedwell" from the fact that the flowers fall and speed away so soon after opening. It will be remembered that a companion ship to the famous Pilgrim ship, Mayflower, was named Speedwell, and true to its name came to a speedy end. Thus narrowly did the speedwells miss canonization among our "national flowers". To judge from the number of common names, English speedwell (*Veronica chamaedrys*), which has escaped to America, is the best known. "Germander speedwell" as we have elsewhere shown, is derived from the specific name, while "God's eye", "angel-eye", "bird's-eye", "cat's-eye", "blue eye" and "eye-bright" refer to the color and brightness of the flowers. "Base vervain" distinguished this from certain species of true vervain (*Verbena*) while "forget-me-not" though quite appropriate is a name that by general consent is bestowed on the species of *Myosotis*.

Veronica arvensis is the "corn speedwell" from its habit of growing in English corn (wheat) fields, *V. Tournefortii* is the "Byzantine speedwell", as well as "bird's-eye" and "cat's-eye" and *V. peregrina* is the "purslane speedwell" and "neck-weed", the latter name alluding to its early use in the treatment of scrofulous swellings on the neck. The "field" or "garden speedwell" is *V. agrestis*. This is also known as "germander chickweed" and "winter-weed". *Veronica hederaceaefolia* is the

"ivy-leaved speedwell" and "ivy chickweed" from the shape of its leaves and "mother-of-wheat", "small henbit" and "winter-weed from its appearance or place of growth. *Veronica serpyllifolia* is the "thyme-leaved speedwell" and "Paul's betony". Concerning the latter name it may be said that the true betony is a mint (*Betonica*) and that there does not appear to be any indication as to who Paul was. The same name, however, is applied to *Veronica officinalis* and this species is also called "ground hele" (heal?), "upland speedwell", "fluellin" and "gypsy weed". *Veronica scutellata* is the "American brooklime". "Brooklime" is said to be a middle English name meaning brook and plant. The European brooklime is *V. beccabunga*. Our species is also known as "blue-bells" and "wall-link". *Veronica anagallis-aquatica* is the "water speedwell", or "water pimpernel". The last mentioned name is more commonly referred to another little plant (*Anagallis arvensis*) of the primrose family which is much like it.

Veronica Virginica is a species so different in habit from the majority of speedwells that it is often placed in a separate genus (*Leptandra*) or at any event, in a separate section of the group. It is most commonly known as "culver's physic" or "culver-root" both of which appear to be fanciful names, for "culver" is an ancient term for dove and doves seldom are in need of medicine. The plant was once regarded as a desirable drug under the name of "Beaumont's-" or "Bowman's-root." "Brinton's-root" is a name of similar import. It will be remembered that a species of *Gillenia* is also called "Bowman's-root". The question as to who Bowman and Brinton were and how this came to be their root, is referred to my readers for answer. I have been unable to throw light on the subject. The plant is also called "tall speedwell" and "black-root", neither name needing an explanation.

The *Pentstemons* are so well known to plant students that the generic name serves as the common name for most species. The name, however, is decidedly appropriate for the group which is practically the only one in the family to have five stamens, though there are many indications in the flowers of other genera that an additional stamen has been lost. The fifth stamen in the group under discussion is in most cases covered with hairs from which circumstance the name of "beard-tongue" arises. *Pentstemon hirsutus* is called "hairy beard-tongue", which seems somewhat redundant until we learn that the adjective refers to the leaves and not to the stamen. *Pentstemon acuminatus* is called "St. Joseph's wand" without any very obvious application.

The plants of the genus *Pedicularis* are commonly known as "louseworts" from a belief that these plants are concerned in the lousiness of cattle. *Pedicularis Canadensis* is most frequently called "wood betony" though the name belongs by right to species of *Betonica*. "Head betony" is a variation of the name which might indicate that the lousiness was not always confined to cattle though it probably refers to the heads of flowers. The name of "high heal-all" distinguishes our plant from at least one of the accepted "heal-alls", a species of *Prunella* to which it has a passing resemblance though it is much taller. The name of "beef-steak plant", given by Britton and Brown is a puzzle. "Snaffles" alludes to the shape of the flowers which somewhat resemble part of the snaffle-bit for horses. The word snaffle, itself, is an old word meaning beak or bill. From the shape of the flowers, also, *Pedicularis Groenlandica* is known as "red elephant". *Pedicularis palustris* is the "purple pedicularis", "marsh lousewort", and "red rattle", the last named being doubtless due to a confusion of this plant with the species of *Rhinanthus*. The color of the flowers in

P. palustris might entitle it to be called "beefsteak plant". "Cow's wort" may be another name to indicate that cows become lousy when feeding where this plant grows.

The true "rattle" is regarded as being *Rhinanthus crista-galli*. It is also known as "yellow rattle", "rattle-box", "rattle bags", and "penny rattle" being so called because the seeds rattle in the inflated pods at maturity. "Penny-grass" and "money-grass" appear to be other variations of "penny rattle". "Yellow cock's-comb" of course alludes to the flowers and "cow-wheat" may be another name connecting this plant with the species of *Pedicularis* though it may be added that this latter name is the only common name of *Melampyrum lineare*. The reason for applying this name to the latter plant is difficult to fathom. The species is an insignificant weed in dryish woods and probably never comes to the attention of the cows.

Anyone who has seen *Castilleja* in bloom will at once recognize the significance of such names as "scarlet painted-cup", "Indian pink", "Indian paint-brush", "red Indians", "bloody warrior", "nose-bleed", and "prairie fire". The word Indian appearing in several of the names seems to be for the sole reason that the flowering bracts are bright colored and therefore assumed to be pleasing to the Indian's taste. "Wickawee" sounds very much as if it might be the Indian name for the plant. It might be said in passing that the flowers of this genus are dull colored. The brilliance of the flower heads is due entirely to the bracts.

The rather insignificant weeds included under the sonorous name of *Gratiola* were once thought, as the name indicates, to be especially favored medicinal plants, hence the name "herb of grace" applied to the species once known as *Gratiola monnieria* but now called *Bacopa monniera*. Other names alluding to its supposed medicinal virtues are "water hyssop" and

"hedge hyssop". *Gratiola Virginica* is the "clammy hedge hyssop" and "golden pert", the latter name of no obvious application.

Paulownia tomentosa, formerly *P. imperialis*, is usually called "empress tree", but "princess tree" would be somewhat nearer the facts since the species was named for the daughter of a Russian king. The name of "blue catalpa" is expressive, though the catalpa belongs to another family. Our plant is sometimes called "neckweed" because reported to be useful in curing scrofula. In the Southern States the tree is generally known as "cotton-wood" in allusion to its extremely brittle branches. "Napoleon", reported from Virginia, is an attempt of the illiterate to use the generic name.

As often befalls plants that are either very conspicuous or quite inconspicuous a number of species in the Srophulariaceae have but a single common name, if, indeed, they have any at all. Thus we find *Schwalbea Americana* universally called "chaff-seed" and *Ilsanthes dubia* called "false pimpernel". *Limosella aquatica*, from its habit of growing in the mud, is known as "mudwort" or "mudweed". *Buchnera Americana* is called "blue hearts" for no obvious characteristic. *Collinsia verna* is appropriately named "innocence" and "blue-eyed Mary", from the bi-colored violet-like flowers, *Mimulus ringens* is everywhere known as "monkey-flower" though it requires a great stretch of the imagination to see in the flower any likeness to the face of a monkey. An allied plant of our gardens is called "musk flower" or "musk plant" from its odor. *Euphrasia arctica* and *E. Americana* are both known as "eye-bright" doubtless from the shape of the flowers and *Odontites rubra*, a European weed rather uncommon on this side of the ocean is known as "red eye-bright".



NOTE *and* COMMENT



CACTUS CULTURE.—It is strange that those interested in the growing of cacti have not thought it worth while to study the plants in their native habitat in order to discover what kind of treatment suits them best. The cactus, like the donkey, can exist under extraordinary hardships and a good many people have jumped to the conclusion that they need such conditions to thrive. Both, however, readily respond to better treatment. The cactus lives in the desert simply because it finds there the conditions that will protect it from other forms of vegetation. When it grows elsewhere, more luxuriant plants soon overshadow it. The desert is its protection. But even in the desert, it is not so badly treated by nature. During the growing season it is drenched by rains almost daily. When it is dry and not growing, it is no more to be pitied than is the rose when it throws off its leaves and stands with bare twigs during the winter. If you want your cacti to grow, therefore, do not spare the water. One must remember, however, that cacti grow in sandy or rocky places where the water runs off immediately, so look well to your drainage. With good drainage and plenty of water during the hotter parts of the year most remarkable results may be obtained. One specimen so treated made more growth in a single summer than it had made in the previous ten years combined. Two joints of another from Florida made nearly fifty new joints and bloomed the first season. Hundreds of others did nearly as well.

It is interesting to know, also, that when the plants are given the right conditions, a large number will live out of doors all winter even as far north as Chicago. Cacti from Santa Fe and from the middle of the Painted Desert have survived winter thus when the temperature went to 25° below zero. cacti of your region therefore is to kick specimens into a com-so long as it is exceptionally well drained. They will grow in ashes, sand, or very stony soil and in the wild are often found in the "dobe" soil from which the sun-dried bricks for building are made. In passing it may be mentioned that the city of Joliet now has one of the best collections of cacti in the northern States having had collectors in the field for the past four years. The curators now feel warranted in offering to name specimens for others. All that is needed to know the cacti of your region therefore is to kick specimens into common fiber box and mail to the editor, who will turn them over to the proper authorities. No packing is needed except to keep them from rattling about in the box.

PHLOX STELLARIA.—Who knows where *Phlox stellaria* can be found? The plant is very much like *Phlox bifida* in appearance, the principal difference being that the corolla lobes of *P. bifida* are cleft down to the middle while those of *P. stellaria* are merely deeply notched into oblong lobes. This latter species is also regarded as smoother than the other, but the plants from Grand Tower, Jackson County, Illinois, reported by Professors Trelease and MacDougal are pubescent. Both plants are species of the Middle West with fairly limited ranges. Gray reports *P. stellaria* from the cliffs of the Kentucky river, southern Illinois and barrens of Kentucky, but a subscriber who searched such cliffs as he could find along the Kentucky river failed to discover the plant and explorations in the vicinity of Lavergne, Tennessee, from whence Gat-

tinger reported it, was also barren of results. If any of our readers know of the plant, we would be glad to hear from them. Is there such a species as *Phlox stellaria* or is it a mere variation of *P. bifida*?

SNEEZEWEED IN OREGON. I wish to record the finding of the "sneezeweed" *Helenium puberulum* at Brownsville, Oregon. This is an extension of the range of this plant approximately three hundred miles northward, its previous northern limit according to competent botanists, being in Humbolt County, California. The plant as I find it here is quite rare, but seems to be quite widely distributed.—*Leslie L. Haskin.*

IDAHO WEEDS.—I have remarked before upon the large number of old world weeds in the intermountain region. I have two new ones to report, of more than ordinary interest. *Atriplex laciniata*, a native of Europe not reported before in the United States. This is well established here (Pocatello, Idaho) as I found it in considerable quantities in several places in vacant lots on the east side. This section has been inhabited by Greeks and Italians for many years so the connection is easy to establish. This plant is called locally "pink weed" and occurs with *A. spatioasa* which it somewhat remotely resembles. The other plant is *Lancisia coronopifolia*, a South African plant extensively introduced on the Pacific coast but not collected inland before. It is a water plant spreading in the ditches in North Pocatello. It is a member of the Composite family distinguished by the conspicuously sheathing petioles. It grows in prostrate mats, rooting at the nodes, in the mud on the banks, or upright, taller and more succulent in the water amid the long grasses.
—*Mrs. M. E. Soth.*

GROWING PLANTS IN CLOSED JARS.—During the past summer, I had my attention called to a case of growing flowering plants indoors without any care being taken of them. Plants of partridge berry (*Mitchella repens*) were collected in west central Michigan in August, 1921, brought to Chicago and placed in a glass aquarium jar about eight inches in diameter, along with some of the soil from the place where the plants were obtained. A moderate amount of water was put in the jar and the top put on over a rubber ring, sealing the jar very nearly if not quite air tight. The jar was kept in an apartment without at any time being exposed to the direct sun. During the winter it was kept above a radiator, which was usually turned off, and during the summer it was allowed to remain close to the house wall on a heavily shaded porch.

When seen by me the plants were very thrifty and looked very close to normal, although it had had neither sun nor water for somewhat over a year. This particular specimen had not flowered, but I was told that in previous years specimens similarly treated had flowered and fruited under these conditions. As the previous specimens had been thrown out late in spring, it is not possible to state how long such a plant might be maintained under such conditions. This might prove a useful hint for someone to have green things growing in his house even under apparently most unfavorable circumstances. The partridge berry seems to be very suitable, possibly because it naturally grows in deep woods, receiving direct sun only early in the spring or in the fall when the trees have lost their leaves.—*Frank C. Gates.* (In the *Fern Bulletin*, vol. 20, page 75 is an account of a fern that had lived for more than eight years in a tightly sealed bottle five by three inches in size. Possibly ferns are more

susceptible to this treatment than flowering plants, but it now remains for somebody to can a number of our smaller plants and report results. Think of an entire canned garden! It is worth trying.—Ed.)

MAN'S PARASITES.—Although man furnishes the most striking illustrations of the ease with which both the parasitic and host roles may be assumed by a social animal, his capacities in this direction have been but little appreciated by the sociologists. Our bodies, our domestic animals and food plants, dwellings, stored foods, clothing and refuse support such numbers of greedy organisms, and we parasitize one another to such an extent, that the biologist marvels how the race can survive. We not only tolerate but even foster in our midst whole parasitic trades, institutions, castes, and nations, hordes of bureaucrats, grafting politicians, middle-men, profiteers, usurers, a vast and varied assortment of criminals, hoboies, defectives, prostitutes, white-slavers, and other purveyors to antisocial proclivities, in a word so many non-productive, food-consuming, and space-occupying parasites that their support absorbs nearly all the energy of the free members of society. This condition is, of course, responsible for the small amount of free creative activity in many nations. Biology has only one great categorical imperative to offer us and that is: be neither a parasite nor a host and try to dissuade others from being parasites or hosts.—*W. M. Wheeler in Scientific Monthly.*

CUBAN YUCCA.—An item in one of the horticultural journals mentions the formation of a company in Havana for the production of starch from the Cuban yucca. This recalls the fact that the plant called yucca in Cuba is what is more familiarly known as the cassava plant (*Manihot utilissima*). This is undoubtedly the original yucca. The name

has since become attached to a very different group of plants of our Southwest through an error of old Gerarde, author of the "Great Herbal".

THE ANOMALOUS LICHEN.—The lichen is the only living object in the world that is entirely vegetable without being a plant! In the vegetable kingdom new individuals come into existence as the result of the union of an egg and a sperm derived from plants like themselves, but the lichen has no parents. It does not grow from a fertilized egg and does not conform to our ideas of a species. Practically everybody is aware that lichens are composed of two very different kinds of plants—an alga and a fungus—which live in partnership and from what might, by some stretch of our definitions, be described as a physiological species in contradistinction to the more usual kind. In this association of alga and fungus a new plant-body is formed that is quite different in appearance from either member of the partnership when growing alone. The fungus partner in the lichen forms spores which may develop into new fungus plants but if they come into contact with the right kind of algae they produce lichens. A lichen once formed reproduces vegetatively by means of soredia which consist of alga cells entwined by strands of the fungus. On many lichens one may find tiny plate-like projections heaped with these minute packages of fungus and alga ready to be blown away by the wind. The lichen is particularly resistent to the influences that hinder the growth of other plants and in consequence is often the only form of life present in deserts, on mountain tops and other inhospitable places. Lichens are also among the most variable of living things. They range in form from microscopic dots on exposed rocks to crustlike masses, leafy thalluses or even bushy forms. They are most luxurious, of course, in the

tropics and there one species attains a length of more than thirty feet! Their color is perhaps most frequently gray-green, but it may be brilliant red or yellow, dead black or pure white. They live on rocks, earth, the trunks of trees or even on the leaves, and one species is reported to be truly aquatic. Several kinds are of economic importance, among them the reindeer moss, the chief food plant of grazing animals in the far north. Several others have been used as food for man in an emergency. The manna of the Israelites is supposed to have been a lichen. Still other species have been known from hoary antiquity as a source of dyes. The familiar litmus so commonly used as an indicator of acids and alkalies is obtained from a lichen. Last but not least of the lichen's good qualities is the effect it has upon the rocks, steadily breaking them down into soil in which other plants can grow.

ORIGIN OF LIFE.—The only living things on our planet that can change carbon dioxide and water into foods are the plants. They are able to do this by means of minute green bodies in the leaves and other parts which turn the energy in sunlight into a form which they can use. Recently it has been discovered that the ultra-violet rays of "light" can change carbon dioxide and water into sugar just as the green bodies or chloroplasts do. Here we have an instance of the formation of food upon which beginning plants might live without the assistance of the plant green. It has always been assumed that the first plants were green, but with a source of food present, this would not be necessary. Plant food, however, is not protoplasm. This latter substance, which is the only part of a plant that may be said to be alive, is far more complex than simple sugars, but it is reported that even this may be formed if the necessary mineral salts are present under conditions of-

ten existing on the earth. From this one may draw the conclusion that the first plant may have received its start in life through some such process.

GROWING EASTER LILIES FROM SEEDS.—Several lilies are known as Easter lilies from their use at Easter, but the one usually referred to when the florist uses this term is a white-flowered species from Japan known as *Lilium longiflorum*. The common white or Easter lily of northern gardens is *Lilium candidum*, but it blooms too late for Easter and is more frequently called Madonna lily or Annunciation lily. This latter species is quite hardy but *L. longiflorum* is less resistant. It is, however, hardy as far north as Washington and experiments made recently indicate that it might be profitable to grow it out-doors as a commercial enterprise. Seeds sown in the greenhouse early in January produced plants that were ready to go into the ground by April or May and several of these flowered before the autumn frosts. A few produced as high as a dozen blossoms on a stem. At the end of summer the bulbs measured from six to eight inches in circumference and when removed to the greenhouse gave as good blossoms as those grown from imported bulbs. Bulblets from which a new stock of bulbs may be produced are found on the stem near the surface of the ground and even the scales broken from the old bulbs when digging may be planted like seeds and will soon produce new bulblets. Sections of the stem, treated as layers, will also produce bulblets. If desired the old bulbs may be left in the ground over winter but they are generally taken up, potted, and brought into bloom. They have been held in cold storage for at least two years and then have given a good account of themselves in producing flowers.

INSECTS AND POLLEN.—In general, insect pollinated flowers are showy and wind pollinated flowers inconspicuous, but the insects often fail to play the game according to the rules and visit many flowers that seem properly designed to be pollinated by the wind. As a matter of fact the abundant pollen of various wind pollinated flowers must often attract insects that normally visit more showy specimens. Nor should it be forgotten that pollen as well as nectar is food for insects. A recent meeting of the Torrey Botanical Club, O. P. Medsger mentioned the fact that bees often visit the blossoms of timothy grass for the pollen. He also reported that mining bees, living on the edge of the New Jersey marshes, collect much pollen which they fashion into balls half an inch in diameter. This is used as food by the developing larvae. The speaker was of the opinion that our native plants are mostly pollinated by native insects and that honey-bees, themselves introduced from Europe, are the chief agents in pollinating the flowers of introduced plants.

ORCHID SEEDS.—Darwin held that in general, plants which produce a large number of small seeds are lower in organization than those which produce a smaller number of better-equipped seeds. Orchids, however, are regarded as the highest type of Monocotyledons and yet their seeds are among the smallest produced by flowering plants and are so incomplete as to lack an embryo. Darwin estimated that a single seed-pod of a species of *Cephalanthera* contained more than six thousand seeds and that a single flower spike of *Orchis mascula* contained 186,000. This, however, is far short of what orchids can do at their best for Fritz Muller estimated that a single capsule of a *Maxillaria* yielded 1,756,440 seeds. One reason for this great profusion of seeds seems to be that orchids depend upon a fungus partner for satisfactory growth

and since the fungus is not present in every soil, a great number of small seeds enables the species to search the world thoroughly for it in a way that they could not do if they possessed fewer and larger seeds.

ACID SOILS.—Only a short time ago, no attention was paid to the effects upon plant growth of acids in the soil. Now it is known that the presence or absence of such substances profoundly affects the distribution of plants. The principal acids that are regarded as rendering the soil sour are acetic, citric and lactic. Contrary to common opinion, it has been found that the majority of plants favor a slightly acid soil. It is, of course, impossible for the ordinary plants to thrive in soils as sour as those favorable to the growth of heaths, pitcher-plants, and bog-plants generally. In artificial bogs and other plantings of acid-soil plants, tannic acid has often been employed to give a proper acidity to the soil but since acetic, lactic, and citric acids have been found to have the same effect it might be possible to produce the required acid conditions by the application of vinegar, lemon juice or sour milk.

OWNERS OF COMPLETE SETS.—Since the last report additional sets of this magazine have been distributed as follows:

69. F. L. Green, Greenwood, Ontario, Canada.
70. Amherst College, Amherst, Mass.
71. Herbier Boissier, Geneva, Switzerland.
72. Dr. Charles Vetter, 67 West 12 St., New York.
73. Wm. E. Brodersen, 1917 Ellis St., San Francisco, Calif.

Mr. Green's set is the second Canadian set and that of the Herbier Boissier the first complete set in Europe. There are now eighteen sets remaining and the price has been ad-

vanced to \$17 for the first 25 volumes or \$21 for sets complete to the present year.

CATCHING COLD.—There are various ways of collecting plants, and catching cold is one of them! When we used to speak of "catching cold" we thought that in some way our trouble was caused by a lowering of the tempature, but it is now pretty well understood that we really do catch a "cold" germ, a small plant which proceeds to live upon our tissues and causes the sore throat, cough and other symptoms that accompany a "cold in the head." One of the easiest ways of catching cold is by being infected from bedding, mufflers, and articles of winter clothing that have been packed away and in which the germs lie snugly concealed during the summer ready to get in their deadly work when these articles are brought into use again during the first cold snap of autumn. In packing away winter clothing, therefore, it is well to first rid them of their plant inhabitants. This may readily be done by sprinkling the clothing with formaldehyde which may be bought at the nearest drug store for a small sum. Formaldehyde, or its weaker solution, formalin, is the substance the wily milkman sometimes puts into the milk to discourage another small plant which otherwise would sour it. It was recently reported that cold in the head is the most popular indoor disease in America. More than a hundred million people indulge in it annually. A subscription to this magazine, plus a nickle's worth of formaldehyde, will, however, enable anyone to avoid the plant, escape the doctor, and live happily ever after.

AMERICAN TULIPS.—We have depended upon Holland adjacent countries for our tulip bulbs for so long that the impression has become general that marketable tulips can be produced nowhere else. It has long been assumed that there

is something in the soil or climate of such regions that renders them peculiarly suited to the production of bulbous plants. That this is an error is shown by a recent Bulletin (No. 1082) from the United States Department of Agriculture in which David Griffiths gives a survey of tulip growing in America. Tulips as good as any that are imported have been grown to a limited extent in Michigan, Vermont, Virginia, California, Oregon and Washington. It is apparent, therefore, that nearly any region with a rich friable soil and not too warm will produce good bulbs. The most extensive experiments in tulip growing in this country have been made in the vicinity of Bellingham, Washington, where the Government maintains a station for this work. The bulletin states that any full-grown tulip bulb is certain to produce a flower if handled properly and that the cause of unsatisfactory bulbs is to be found in careless handling of the bulbs after they are dug. As is so frequently the case, ripening continues in the bulbs for weeks after they are dug. Under ideal conditions more than 150,000 bulbs large enough to flower have been produced on a single acre. The tulip has few if any diseases and can be grown to maturity in a single season.



EDITORIAL



The August number of this magazine may be a few days late, owing to the fact that the Editor expects to be conducting a botanical exploring party across the Painted Desert of Arizona in July. The party will visit the Pueblo Indians, the cliff ruins, Navajo Mountain and the Rainbow Bridge and hope to bring back a rather complete collection of the plants. The region is one that has never been explored botanically but previous trips have shown the flora to be most interesting. If any of our readers care to join the party, we can find place for one or two more. Transportation part of the way is by horse-back and sleeping accomodations consist of a soft bed in the sand. Food will be plain but sufficient. That the trip will not be too strenuous may be assumed from the fact that nearly half the party are women. The cost, aside from the railway fare, is negligible.

* * *

Each year a thousand or more new readers ask for sample copies of this magazine. If all subsequently subscribed our circulation would justify a much larger magazine than we publish at present, but unfortunately they do not. As a matter of fact it requires a rather philosophical type of mind to appreciate the matter we publish. Without attempting to compliment our readers we must nevertheless add that without a single exception, all who are personally known to us are above the average in intelligence. After thinking the matter over we are disposed to think that this is also a compliment to us. Whenever we find a new reader with the type of mind

indicated, he subscribes as a matter of course and if he renews his subscription he rarely fails to continue with us for an extended term. We have many subscribers who have been with us for twenty years and at the present time perhaps five percent are paid up to the end of 1927. More than half of our subscribers are on our permanent list, having ordered the magazine sent until we are notified to stop. If any of those who have recently joined us think well enough of it to wish it continued we suggest that an order to transfer their names to the permanent list does not pledge them to subscribe for more than two years and does secure the magazine at reduced rates. Further particulars will be found on our regular subscription blanks. At this time we also take the opportunity to solicit more short notes from our readers. We are of the opinion that more and shorter articles are desirable and shall endeavor to make this change in our contents as soon as such matter can be secured.

BOOKS AND WRITERS

Fire in the printing plant of the *Guide to Nature*, late in February, destroyed the stock of paper, cuts and other material belonging to the magazine. * * * There was no insurance. * * * Editor Bigelow says that this is his first real fire though he has been under fire many times. * * * This reminds us that Southern legislators are making it hot for the evolutionists. * * * Texas and Oklahoma have joined South Carolina and Kentucky in putting an end to evolution by law. * * * Now if they would only legislate the boll weevil out of existence. * * * Just like Volsted exterminated the yeast plant! * * * Facts are stubborn

things and refuse to be bound by man-made laws. * * * So is and does evolution. * * * However, if we remember correctly, Mr. Noah's family give rise to all the different kinds of people on this planet. * * * Kentucky ought to do something about this! * * * It sounds just like evolution. * * * Somebody is always obliging enough to do the thinking for the rest of the world. * * * A newly appointed Commissioner of Indian Affairs is devoting himself to the religion of the Indians. * * * Expects to convert them by law. * * * He says the religious dances of the Indians is distasteful to him and they really must not do it. * * * And yet the Turk has been accused of being religiously narrow-minded! * * * The new *Nature Magazine* has come up to expectations. * * * It is remarkably well illustrated and presents the showier side of nature very attractively. * * * It is bound to be popular. * * * Some of the nature books are coming back. * * * Macmillan's have issued Peterson's "How to Know Wild Fruits." * * * This is the only book on the subject. * * * It costs \$1.75 and is worth it. * * * There are about 450 plants on Santa Catalina Island and L. W. Nuttall and C. F. Millspaugh have told about them in a publication of 297 pages, issued by the Field Museum. * * * They found two young plants of the "California Poppy" on the beach and pronounced them a new species which they named in honor of a prominent chewing-gum manufacturer. * * * Yes, they did! * * * There are some truly remarkable plants on Santa Catalina and somebody should give us a less technical account of them. * * * Anybody who has never seen the *Joemma Bulletin* has still something in the botanical line to look forward to. * * * You can get a copy free by addressing Joe Smith, Longbranch, Wash. * * *

The address of Eva Kenworthy Gray who is publishing the *Flower Journal* is 32nd and Woolman Avenues, San Diego. * * * Several issues have appeared and the publication shows indications of surviving. * * * "The Fern Lovers' Companion" is probably the most successful fern book ever written. * * * It has been taken over by Little Brown & Co. of Boston, at a price calculated to make the authors of all other fern-books envious. * * * We again congratulate the author. * * * The *Ohio Journal of Science* has changed from nine numbers a year to bi-monthly. * * * The January issue begins the twenty-third volume. * * * "The Field and Camp Notebook" is a fat little book designed to make out-door note-taking easy. * * * It is by Comstock and Vinal and published by the Comstock Publishing Company, Utica, N. Y. * * * There are many fine drawings of birds, flowers, mammals, insects, etc., outlines for studying them, and star-maps for the different months. * * * Most of the outlines are excellent but we were disappointed in the one for studying an animal. * * * We tried it on the earthworm and it would not work. * * * Wonder if they could have meant this outline for the study of *mammals*?

Walter Stager's "Tall Bearded Iris" is probably the first book devoted exclusively to the iris that has appeared in America. As its name indicates, it deals with only one branch of the Iris Family—the group commonly known as German Irises—but since this is the group from which most of the garden irises are derived the book may be said to cover that part of the subject of interest to iris growers. The author's sub-title is "A Flower of Song" and this is justified by some 200 quotations referring to the iris, some of which run to

more than a page each. A chapter is given to the origin of the names, another to the use of the iris in art and trade, and then follow more practical chapters on structure, planting, cultivating, propagating, insect and fungus enemies, etc. The book ends with a rather extensive descriptive list of the better varieties and includes a list of standard and recently introduced varieties graded by the recent "iris symposium". The book is exceptionally well printed and has a fair number of illustrations. All iris fanciers will, of course, add it to their lists. It is published by Madison Cooper, Calcium, N. Y. at \$2.00.

The book of "Hardy Perennials" recently issued by Charles Scribner's Sons, is by a British author, A. J. MacSelf, the founder of the National Hardy Plant Society of England and naturally reflects somewhat the British view-point. The first part of the book contains seven chapters on preparing the soil, planting, cultivating, and the like, all of which is useful and up-to-date. The larger share of the volume is taken up with "Plants Worth Growing" an alphabetically arranged list of all the hardy perennials commonly grown in Great Britain. The notes on the different species are not of the stereotyped botanical kind, but appear to have been made from the author's personal experience with the plants. They consist of opinions as to their value for cultivation, special ways of growing them, the selection of the best varieties, and notes on color, form, floriferousness and the like. The book, of course, can not be unreservedly recommended to beginners in America, but it is an excellent presentation of how the plants are treated in English gardens, from which all can learn much. In make-up it suggests Thomas' "Hardy Perennials" and since this latter volume is now out of print the new one should be especially welcome. It contains upwards of 200

pages and is illustrated by 8 colored plates and others in black-and-white. The price is \$2.75.

The greatest objection to many books intended for the identification of the trees, is that the keys they contain are too frequently based on characters to be found for only part of the year. For instance, a key based on flowers or leaf characters is of little use in winter, while one that is concerned principally with fruits is hopeless in spring. In a re-issue of Dr. John H. Schaffner's "Field Manual of the Trees", the objections have been met by the inclusion of three keys; one to the trees in the winter condition, one for the summer condition, and a third after the common style of botanical keys which takes advantage of any salient character. Following the keys, all the species north of Virginia, Kentucky, and Missouri, and east of the Prairie region, are described in untechnical language with additional keys to the species of each genus. In estimating the radical or conservative tendencies of tree books, one may always depend upon the treatment given the genus *Crataegus*. In the present volume 52 species are recognized, while from essentially the same region Britton's Manual lists 31 and Gray's 65. Incidentally, for once, at least, Britton escapes being regarded as a radical. In addition to a description of the species, the book includes the uses to which they may be put. The nomenclature is America's own private brand which even so good a book as this cannot make respectable. The volume is published by R. G. Adams & Co., Columbus, Ohio.

The series of "Open Country Books" recently inaugurated by the Macmillan Company, New York, is described as "a continuing company of genial little books about the out-of-doors." It leads off with a book about the Apple Tree by L.

H. Bailey, the editor of the series, followed by books about the cow, the vegetable garden, and vacation camping, with promise of many more of similar nature. Dr. Bailey's book might be described as a series of essays on the history, botany, cultivation, propagation, and uses of the apple. From the first chapter which describes a land "where there is no apple tree" to the seventeenth and final chapter on the "appraisal of the apple tree" the book is full of information told in an attractive way. The apple is one of the oldest of cultivated fruits. Charred remains of diminutive apples have been found on the sites of the prehistoric lake dwellings in Switzerland. The apple seems to have originally grown wild in central Europe but has since followed man to all the cooler parts of the world and now is found wild in many of them. It is so much a part of the landscape that the author devotes one chapter to this phase of his subject. The book is well worth reading, not only by lovers of out-doors but by commercial growers of the fruit as well. The price is \$1.50.

It perhaps needs a peculiar type of mind to get excited over the study of grasses. The flowering parts are so unlike the flowers of better known plants that the novice is much perplexed at beginning. In Agnes Chase's "First Book of Grasses," issued by the Macmillan Company, New York, the author well says that it is impossible to make a book on how to know the grasses that may be used without mental effort, but those who really want to study these plants no longer have the excuse that they lack directions for beginning. In this new grass book, a very clear account is given of the puzzling structure of the flowers accompanied by many of the excellent drawings for which the author is noted. The book begins with the simplest and plainest forms and carries the student on through a series of twelve lessons to the more complex variations from

the type, and since the identification of grasses is based almost entirely on the flowers, the student is soon in possession of the information needed to make the work easy. As a matter of fact, grass flowers, which at first seem so complicated are in reality very simple. They lack the showy calyx and corolla of more familiar flowers but stamens and carpels are like those of ordinary flowers and the chaffy scales mixed with them may be referred to the bracts that are present in so many other flower-clusters. Using this book to start with and a good manual of the grasses for reference, it would seem as if anybody might soon become acquainted with the grasses of his region.

The most sumptuous volume on the pear ever issued in America is without doubt the volume published by New York State in its series of Fruit Monographs. Previous volumes have dealt with apples, plums, cherries, grapes and peaches. The present issue, like the others, is a quarto profusely illustrated by colored plates. The six hundred pages of text were prepared by Dr. U. P. Hedrick and a corps of assistants and comprises about everything known about the pear. Though entitled "The Pears of New York" it is really an account of the pears of the world and as the preface observes it aims to make a complete record of the development of the pear wherever cultivated up to the present time. The evolutionary history of the pear is involved in some obscurity. It is a fruit of northern origin and did not appear in civilized gardens as early as other fruits. It is said that the bible fails to mention this fruit and that it has no name in the Sanscrit or Hebrew. The twenty or more wild species of pears are all natives of Eurasia. The pear genus, however, is of much wider distribution. There are at least sixty species in it, among them several that are American, such as the mountain

ash and the choke-berry. None of those we regard as true pears have been found on any part of the Western Hemisphere, or south of the equator in the Old World. Several species are found in Korea, China, Japan and Persia and the others in western Europe. There is great variation in the size and quality of the fruit; one species illustrated in the book has fruits no longer than grapes. Only three of these wild pears seem to have been drafted for garden use. Of these the most important is *Pyrus communis* of southern Europe and Asia. *Pyrus nivalis* of southern Europe and *P. serotina* from China and Japan are the others. From these by hybridization have sprung several hundred varieties, few of which have sufficient merit to be of value. Owing to difficulties that attend keeping and marketing pears, this fruit is not as extensively grown in America as are apples and peaches. The present volume ends the series of books devoted to tree fruits, but it is intimated that in time we may have a new series dealing with small fruits. The books thus far issued are invaluable as reference works and unsurpassed in beauty, accuracy, and general excellence..

After all, where is the flower lore? for the first book, not the last, should contain the poetry of flowers. The Natural System may tell us of the value of a plant in medicine or the arts, or for food, but neither it nor the Linneau to any great extent tell us its chief value and significance to man. There will be pages about some fair flower's qualities for food or medicine but perhaps not a sentence about its significance to the eye (as if the cowslip were better for greens than for yellows) about what all children and flower-lovers gather flowers for.—HENRY D. THOREAU.





THE CENTURY PLANT

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*How deepening bright, like mounting flame doth burn
The goldenrod upon a thousand hills!
This is the autumn's flower and to my soul
A token fresh of beauty and of life,
And life's supreme delight.*

Richard Watson Gilder.

THE CENTURY PLANT

By MRS. O. A. BUDD.

THE accompanying illustration shows the species of century plant that is found growing wild in the northern part of Arizona. The blossoms, which are reddish-yellow, are very similar to banana flowers. They have no fragrance but keep perfectly for several weeks. It is the custom here to bring in a blooming specimen from the hills and fasten it to some post down town to give visitors an opportunity to see this curious plant in bloom.

In Florida the natives claim that the plant must be a hundred years old to bloom, but in Arizona they bloom in less time. How old the plant must be I cannot say, but I can say that as soon as the flowers fade the plant begins to die and the huge stem dries out completely. The dead stem is brought to town and sawed into two-inch slices. This makes wonderful pin-cushions. Needles and pins remain ever bright and sharp in this convenient cushion.

After the stem dies, a new shoot from the root, which looks like a neighboring plant, grows with renewed vigor. There are often a dozen such plants in a clump on the hillside.

OUR COMMON DANDELIONS

By ERNST A. BESSEY

THIRTY years ago but one species of dandelion was common in the Northeastern quarter of our country, *Leontodon taraxacum*, as it was called by Linnaeus, or *Taraxacum officinale*, as many books still call it without regard to the undoubted priority of the Linnaean name. About fifteen years or more ago there began to be found the red-seeded dandelion. At first this was found only in a few spots and was a great rarity, but it has been spreading rapidly, until now it is quite common in many localities. Its name is *Leontodon erythrospermum*, or *Taraxacum erythrospermum* for those who deny to Linnaeus the right to use the name Leontodon, which means "lion's tooth," or "dent de lion" (corrupted in English to dandelion,) for the plants under consideration.

When the writer came to Michigan over twelve years ago the red-seeded dandelion was to be found in a few spots on the campus of the Michigan Agricultural College and only as a very rare plant elsewhere. In the years that have intervened since then it has been increasing in abundance not only at the College but elsewhere. It is now to be found in many localities in the Lower Peninsula and the writer has collected it at widely separated places in the Upper Peninsula. It has beyond doubt come to stay.

One of the first things attempted was to see whether the two species can be distinguished before the seeds are mature. In general the red-seeded species is smaller than the other, and

the fruiting heads appear less dense and not so bright white; furthermore the flowering heads appear a brighter yellow in color. The leaves, too, seem to be more deeply incised. These differences, however, are soon found not to be constant. The common dandelion when crowded or on poor soil is often as small as its red-seeded relative, with as thin a head of fruits. The flower color as well as the degree of incision of the leaves are very variable. In fact, it is often impossible for the writer to distinguish a medium-sized common dandelion from a red-seeded specimen until the plants have mature fruit. Even the bract character used by Britton and Brown, the reflexed position of the outer bracts in the common dandelion and their spreading or ascending position in the other species absolutely fails in most cases. However, the large sized plants are invariably the common species.

.It was soon noted that the red-seeded species ceased to flower as summer came on, so that the only dandelion in blossom at East Lansing after the middle of June were the other species. On the other hand the first to blossom were the red-seeded sort. During the latter half of May the two are both in full bloom. As the cool weather of Autumn comes on the red-seeded species again begins to bloom, being the last to show its flowers in that season. It is interesting to speculate upon the relation of the cooler weather to the blossoming of the red-seeded sort, as throwing light on the probable origin of the species. It seems that the species was first described from the cooler parts of the Russian Empire. The original home of the common dandelion is clouded in the mists of antiquity, and can perhaps never be found, so completely has it become a companion of man in his wanderings.

Michigan Agricultural College,

Department of Botany.

PRODUCING DISEASE RESISTANT PLANTS

By CASPER L. REDFIELD.

A PLANT is an organism composed of many cells. In the growing part of the plant these cells are living things which have within them certain powers. A plant disease is a conflict, or the result produced when these living cells are attacked by parasites which are themselves living cells. If these parasites are sufficiently numerous, and have greater powers of attack than the plant cells have of defense, then the plant dies. If the parasites are not numerous, or have less powers than the cells of the plant have, then the plant is affected little or not at all by the attack.

Plants are of many kinds and diseases are of many kinds, but as we are not going into the technicalities of any particular disease, we will refer to plants and diseases in a generic way. A particular plant may have the power of resisting one disease and not the power of resisting another disease. In other words, disease resistance is specific, and the fact that a plant has the power of resisting one disease does not give it the power of resisting some other disease. Also, the power of resisting a particular disease is specific for the plant which has it. One plant of a variety may have such great power of resisting some particular disease that it is said to be immune, and another plant of the same variety may have so little power of resisting the same disease that it is said to have none at all.

These qualities of resistance and susceptibility are inherited qualities. The progeny of resistant plants are resis-

tant, and the progeny of susceptible plants are susceptible. What we have to consider here is the process of making susceptible plants resistant so that their descendants in later generations will also be resistant.

The power which a plant cell has of resisting the attack of some other cell (a disease germ) is developed in the same way that any other power is developed, and that is by exercising in a particular way the powers previously in existence. A man gets his muscles more powerful by exercising them, and in no other way. A plant gains in its power of resisting a particular disease by growing in the presence of and by fighting that disease, and in no other way. When plants of a non-resisting variety are grown on sick soil,—soil which is infected with disease germs,—some of them die and some survive to produce seeds. If seeds are taken from the survivors and again planted on sick soil, some resultant plants live and some die. After a few generations of this process, all of the plants left have powers of resisting the particular disease involved, and few or none die when raised in presence of that disease.

It is said that in this process the weaker plants are killed and the more resistant ones survive. This process is called "selection," and the theory of selection is based on the assumption that some of the plants of the "non-resisting" variety have more resistance than others. It is also based on certain other assumptions which we will consider later. But I think that before we get through, it will be seen that the selection theory in the production of disease resistance is an illusion, and that selection has nothing to do with the matter. Also, that the art of man is not capable of causing selection to have any part in the production of disease resistance.

For some months I have been in correspondence with a considerable number of Agricultural Experiment Stations on the question of producing disease resistant plants, and here I will refer to some of the experiments at two of these as being illustrative of points which I wish to call to the attention of readers.

At Pullman, Washington, Dr. E. F. Gaines has been experimenting on the production of disease resistance in a variety of plants. Referring to a variety of wheat he says that "selection within a pure line under conditions favoring maximum infection has not changed the resistance of a given variety during five generations." Speaking of another variety originating in a cross he says that "the immune selections have not changed in genetic characteristics during the seven generations that they have been grown in the smut nursery." Here we see that when other conditions remain constant, selection accomplishes nothing in the way of increasing the disease resistance of the plants being experimented upon.

At the Agricultural Experiment Station at Agricultural College, North Dakota, Professor H. L. Bolley planted one seed from a non-resisting variety of flax on soil which was slightly infected with wilt disease, but not infected enough to kill the plant. From the plant thus grown on slightly sick soil he took one seed which he planted on soil slightly more infected than the year previously. From this second plant he took one seed and planted it the third year on soil still more infected. And so on.

In regard to this process, Prof. Bolley says that he has "never been able to procure a full-fledged wilt-resisting plant from the first generation," but that after six or seven years of this procedure he has flax plants which will thrive on soil so heavily infected that the original stock "could not produce

a single plant to the acre." He also says "it is evident that the resisting ability increases from year to year, from generation to generation, even in a pure, pedigreed strain which came originally from a single non-resisting seed."

In this operation of producing fully resisting plants from non-resisting stock there is no trace of selection. There were no deaths of weaker plants and survival of more resistant ones. It is a plain case of resisting power increasing from generation to generation, and the thing to be considered is the source of that increase. The experiment just described is not affected in the least by the fact that Bolley carried on another experiment at the same time at another place on another plant. Neither would it be affected if he had carried on a thousand other experiments at a thousand other places. Nor would it be affected by any accident which happened to any one of such other experiments.

Flax is a self-fertilized plant not known to cross pollinate when left to itself. When the experimenter gets resistant plants from non-resistant stock, the pedigree of the resistant plants is that set forth in the experiment stated. Nothing in the way of improvement by selection would appear if he sowed a whole field with seeds instead of planting one seed, and part of the resulting plants should die. The death of one plant does not add anything to the resisting power of a sister plant on the other side of the lot, and increased resisting power is the thing which was obtained.

There is a sharp distinction between the experiments referred to by Dr. Gaines and those carried out by Prof. Bolley. When a pure line is raised year after year under uniform disease infection, selection is powerless to bring about any improvement in disease resistance. When a pure line is raised year after year under gradually increasing infection, improved

disease resistance keeps pace with that increased infection without the use of selection.

When seeds from non-resistant plants are sown on disease infected soil, the fact that some die and others survive is not evidence that the survivors had greater inherent resistance than those which died. Soil which is supposed to be uniformly infected is in fact spotted. Disease producing bacteria are in colonies and are not uniformly distributed. Plants which fall on heavily infected spots are killed, while those on lightly infected spots survive. Under these conditions, some will live and some will die if they all have the same degree of resistance. Even when different seeds have inherent different degrees of resistance, the most resistant ones may die by reason of falling on heavily infected spots, and the least resistant ones may survive by reason of falling on lightly infected spots. The appearance which is called "selection" comes from different degrees of infection, and not from different degrees of resistance.

It may be assumed that uniform infection gradually intensified would result in selection in the strict meaning of the term, and that ordinary infection in a large field has parts which are near enough to the uniform to bring about that result. That this is not so may be seen by referring to the characteristics of living protoplasm wherever it has been found. One of the most fundamental of characteristics is that the powers of protoplasm increase when exercised, and that such development extends indefinitely under continually increasing exercise. While there is no known limit to the development of powers by exercise, the observed development is not uniform under uniform exercise. Rapid development, slow development, and apparent cessation of development are interspersed along a period of activity. In studying mental de-

velopment under training, psychologists find times when training seems to produce no results, and they designate such pauses as "plateaux of learning."

Dallinger subjected little animals called flagellata to gradually increasing temperatures. Beginning with those living in water at 60 degrees, Fahr., he found that he could increase the temperature quite rapidly up to 73 degrees at which point he had to hold it stationary for two months before he could increase it further without killing them. Past this point he was able to increase the temperature rapidly again up to 78 degrees, at which point he had to hold it for eight months. He found several other sticking points on the way of getting them to live at 158 degrees, which point was reached in about six years.

Under continued training a horse will continue to gain in trotting power up to some point beyond 17 years of age, but not in every year of that time. Sometimes there will be a lapse of one year and sometimes a lapse of two years in which training appears to accomplish nothing, but if training be continued, rapid improvement comes on again. In different horses these sticking points come at different times in life. The same thing is found in milk production by cows. When regularly milked, production continues to increase up to 12 years of age, but not in every year of that time. As in horses, these sticking points come at different times in different cows.

By a great many tests of different kinds we find that powers in plants are developed the same as they are in animals, and that the development of disease-resisting powers comes under the same laws as the development of other powers. Applying these principles to the matter under consideration, it will be seen that in a field of plants growing under disease conditions, at any given moment some plants

are gaining rapidly, some plants are gaining slowly, and some plants are in a resting stage as far as the development of disease resistance is concerned. If the degree of infection be increased so that some but not all plants are killed, those that will be killed are those which happen at the time to be in a resting stage. As all plants, superior and inferior alike, have to go through resting stages at irregular intervals, it will be seen that causing such deaths is not a process of weeding out inferior ones.

Disease resistant plants have been produced under varying circumstances at different experiment stations, but the one circumstance which cannot be omitted is that they must be grown under disease conditions. A plant or an animal develops disease resisting power in fighting a disease, and disease resistance is a heritable thing. The obvious inference is that the acquired resistance is inherited. The stock argument against that is that disease kills the weaker plants and leaves the stronger, and that this selection brings about the improvement. It has just been shown that selection does not operate as it is assumed to operate, but the main argument against the selection theory is that killing a weak plant does not add to the strength of a strong plant, and the thing obtained is increase of disease-resisting power. No one has shown any process of increasing any power in any other way than by exercising the powers previously in existence.

PLANT NAMES AND THEIR MEANINGS—XVI THE CRUCIFERAE

By WILLARD N. CLUTE

THE fifteen hundred or more species of Cruciferae form a very distinct and characteristic group. So nearly alike are the flowers of the different species, that the botanist finds them practically useless for classification and is obliged to resort in most cases to seed characteristics for a satisfactory differentiation of his specimens. The flowers are peculiar for having four instead of five parts in each whorl. The stamens however, are six in number and consist of two whorls, one of four and one of two stamens, the latter somewhat longer than the others. In the majority of the Cruciferae the petals spread out in the form of a cross and from this circumstance the family name, which means "cross-bearers," is derived. The species are commonly called cresses but contrary to the general assumption the word cress is not derived from cross. The family is occasionally known as the Brassicaceae, a name founded on the genus to which the cabbage belongs but Cruciferae is a very old name and almost universally used.

Nearly all the plants of this group are characterized by a pungent juice which has made them valued as pot-herbs or condiments. None of the species is poisonous but many are practically inedible because of an unsavory taste. The genus *Nasturtium*, to which the horse-radish belongs, is typical of these pungent herbs and is properly named from the Latin *nasus tortus* which is literally "nose twister." *Cardamine* is

a genus whose name is reputed to be that of some ancient species of cress known to Dioscorides, but Wood says the name comes from Greek words signifying "heart" and "to strengthen" in allusion to its *stomachic* properties. Here, indeed, the way to the heart appears to be through the stomach! St. Barbara is reputed to have discovered the medicinal virtues of the plants dedicated to her under the name of *Barbarea*. It may be that a certain amount of sanctity is required to perceive such healing virtues, for ordinary mortals confess that the plants have none, except that like many others they may be used as antiscorbutics. *Erysimum* is said by Gray to be from the Greek meaning "to draw blisters," but Wood, again, says the name means "to cure," in this being apparently willing to go a bit further than his contemporary in endorsing the virtues of the plants.

More important than any of the preceding in popular estimation are the plants in the genus *Alyssum* which are regarded as useful in the cure of hydrophobia. The generic name comes from a Greek plant once used against hydrophobia, according to Gray, but Wood says it comes from a privative and the Greek word for rage and that it was used to allay anger by the ancients. Since the plant will not cure hydrophobia it is fair to assume that Wood's derivation is the correct one though this may arouse anger in some quarters instead of allaying it. The name of *Draba*, given to the little whitlow grass, is said to mean acrid or biting and was originally applied by Dioscorides to some species of cress now unknown.

An unusual number of genera in this group have been named in honor of botanists and patrons of science. There is first the American moss student, Leo Lesqueraux, after which *Lesquerella* is named and also Dr. M. C. Leavenworth

a southern botanist who discovered the plants since called *Leavenworthia*. *Berteroa* is for Carlo Guiseppe Bertero a Piedmontese botanist, *Neslia* is named for J. A. N. de Nestle of Poitiers and *Conringia* is for Prof. H. Conring of Helmstedt. Count F. G. de Bray of Rouen is honored by *Braya*.

In contrast to generic names in other families, though quite natural under the circumstances, none of our cruciferous genera is named for the appearance of the flowers. The nearest we come to it is in *Hesperis*, the name of the dame's violet which means evening and alludes to the fact that the flowers give off their perfume then. There is also *Iodanthes* which is literally violet-colored flower.

Names referring to the seed-pods are numerous. Our familiar shepherd's purse has a generic name, *Capsella*, which is the diminutive of *capsa*, a box. Our word capsule comes from the same source. The flat pods of the plants in the genus *Thlaspi* account for this name from Greek meaning to crush. *Silene* and *Lunaria* both refer to the moon, the first being from the Greek and the second the Latin. Here the round flat moonlike pods gave origin to the names. *Diplotaxis* is from the Greek and alludes to the two-ranked seeds and *Lepidium* means a little scale, which the small seed-pods resemble. Whether *Lobulus* meaning "a little lobe" refers to the "two-lobed hairs" is a question. It may have originally referred to the capsules which in so many species are lobed.

From the Arabic comes *Arabis* and *Cakile*. *Brassica* is the Latin name for the cabbage which is said to have been originally the Celtic *bressig*. *Sisymbrium* is an old Latin name for certain species of mustard and *Camelina* is the Greek for "dwarf flax" (*chamae-linum*). *Dentaria* is from the Latin *dens*, "a tooth," in reference to the toothed projections on the root-stocks of some species. *Coronopus* means

"crown" and "foot" and we expect to learn that it refers either to the flowers or the roots, but it is said to refer to the deeply cut leaves! The scientific name of the onion (*Allium*) is supposed to have given the generic name *Alliaria* to certain plants called garlic mustard in the vernacular. *Raphanus*, the name of radish, is from words meaning "quickly" and "to appear" which pretty accurately describes the behavior of this lively spring edible.

It is not surprising to find that the cress family was one of the first families to be recognized when the early scientists were arranging plants in groups. The flowers are all so much alike that even the novice perceives the relationship. Although the arrangement of the four petals in the form of a cross has given the name of Cruciferae or cross-bearers to the family, the word "cress," by which the species are commonly known, is much older. From the earliest times the name cress, or as it is often spelled in the language of northern Europe, cresse, krasse, cerse and kers, was the name of the plants belonging to the cabbage family. Incidentally it may be said that the phrase "not worth a curse" (kers), used to signify something of little value, was derived from the same word and originally carried no stronger implication.

Another ancient term applied to many species of Cruciferae is "rocket." This was originally derived from an edible species of the Old World, *Eruca sativa*, whose name the Italians corrupted to *ruchetta*, the French to *roquette*, and the English to *rocket*. The word "mustard" so commonly applied to members of this family comes from the name of new wine or "must." The seeds of various species were made into a condiment mixed with must, as we now use vinegar, and so derived the name of mustard.

With the explanations of the terms rocket, mustard and cress in mind, most of the names of the Cruciferae become intelligible. Indeed, the terms just mentioned are used in connection with so many plants in this family that the subject of common names, in consequence, becomes quite monotonous. Beginning with the long line of cresses, we have first of all the species of *Arabis*, nearly all of which bear the name of "rock cress" from their preference for rocky places. *Arabis Canadensis*, however, though it lives on rocks, is generally called "sickle-pod" from the long, curving and conspicuous pods. *Arabis glabra* is the "tower mustard" or "tower cress" the name doubtless given because it grows on old towers in its native land though the name may refer to its own height in comparison with others of its genus.

Two genera divide the honors as regards the designation of the true cresses. One is the genus *Nasturtium* which in recent years has been occasionally known as *Radicula* or *Roripa*. To this genus, whatever it may be called, belongs the true "water-cress" (*Nasturtium officinale*). Among its other names are "well cress," "water grass," "crashes," "brown cress" and "brooklime." The last mentioned name means simply water plant; the others are self-explanatory. *Nasturtium sylvestris* is the "yellow cress" or yellow water-cress" from the color of its flowers and "wood cress," a translation of its specific name. The "lake cress," "river cress" or "lake water-cress" is *Nasturtium lacustre*. Another "yellow water-cress" is *N. palustris* which is more properly "marsh cress" if its specific name means anything. The plant is also known as the "yellow wood-cress." To the *Nasturtium* genus also belongs the familiar "horse radish" (*N. Amoracia*) whose name alludes to the pungency of its root and not to the animal suggested. In this and so many

other common names, horse simply signifies big or strong.

The second cress genus is *Lepidium* which contains the "garden cress" (*L. sativum*). This plant, like the water-cress, is of European origin; in fact, of our ninety-two species of Cruciferae, just about half are immigrants. The species just mentioned is occasionally called "golden cress," and "golden pepper-grass," the last term referring to its pungent qualities. "Tongue grass" may have been suggested by the same characteristic. It may be noted in passing that "grass" frequently used in connection with the cresses, is probably a mispronunciation of the word cress. One of the commonest of our weeds is *Lepidium Virginicum* which is known as "wild pepper-grass" and "tongue grass." Cage birds are fond of its seeds hence such terms as "bird's pepper," "bird-seed," and "chickweed." Several other species in this genus are called "pepper-grass." *Lepidium campestre*, is, as the specific name indicates, the "field cress." It is also known as "pepper-grass," English pepper-grass," "poor man's pepper" and "glen pepper." Like some of its congeners it is "yellow-seed." It is also known as "cow-cress," "crow-weed" and "false flax" for no very obvious reason. The name of "Mithridate mustard" sometimes applied to this species belongs more properly to another cress *Thlaspi arvensis*. *Coronopus procumbens* is the "carpet cress," or "herb ivy" from its creeping habit but it is more commonly known as "wart cress," "wart-wort," "sow's grass," "swine's cress" or "buck's horn." All these are Old World names probably originally referring to some fancied use of the plant in curing warts and of no particular significance at present. The plants best entitled to bear the name of "false flax" are the species of *Camelina* for the common name is a literal translation of the scientific one. *Camelina sativa* is also known as "Dutch flax" in allusion to

its flaxlike leaves. The plant is also called "gold-of-pleasure" in reference to the yellow flowers but "oil-seed" and "Siberian oil-seed" have been inspired by more utilitarian qualities. "Madwort," sometimes heard is due to a confusion of this plant with species of *Alyssum* which, in a way, it resembles.

Another group of cresses are those belonging to the genus *Cardamine*. One of the most attractive plants of early spring is *Cardamine bulbosa* the "spring cress," per excellence. A species of similar appearance is *C. Douglasii* known as "purple cress" and "mountain water-cress." *Cardamine rotundifolia* is another "mountain water-cress" and is also called "American water-cress" and round-leaved water-cress." *Cardamine bellidifolia* is the "alpine cress" and *C. hirsuta* is the "bitter cress," "land cress" and lamb's cress." The last name is evidently derived from the one that precedes it and this in turn from the fact that the plant does not favor places as moist as the majority of the species require. An allied species, *C. pratensis*, is also called "bitter cress" but it has many other names among which are "meadow cress," derived from its specific name, and "milkmaid," and "May-flower" from its color and time of bloom. The plant is, however, generally called "cuckoo flower" but Shakespeare's cuckoo flowers was of a different color and is perhaps the marsh marigold (*Caltha*). Our plant, however, is certainly that "lady's smock" to which the poet alludes in the lines.

"When daisies pied, and violets blue,
And lady-smocks all silvery white
And cuckoo-buds of yellow hue
Do paint the meadows with delight"

BLUE DANDELIONS

By NORMAN JEFFERIES

BOTANICAL scientists and amateur lovers of wild flowers will thrill in unison at the announcement in an authoritative journal heralding the discovery of an entirely new variety of a species whose type representative is, perhaps, more familiar to even casual observers than any other of our common flowers of roadsides and fields.

Proclaiming in a recent issue the discovery after a nine years' search of what is proudly described by its fortunate finder as "the fabulous blue dandelion" the editor of the *Atlantic Monthly* in personal response to inquiries not only offers practical substantiation but assumes individual responsibility for the authenticity of the new variety.

Those who study and collect our native and introduced species of wild flowers will understand the motive of the writer in seeking to secure from the *Atlantic* editor details in verification of the most remarkable botanical find of the century. Properly jubilant over the discovery of a new variety hitherto overlooked by scientific and amateur students, the editor promptly furnished what he regarded as proof positive, or, as he puts it, "the credence of his own senses." To which he adds "he has seen dandelion before—a good many of them—and that this is a blue one he can swear most positively." Which coming from the editor of that sacrosanct repository of all learning, the *Atlantic Monthly*, should convince and doubtful inquirer.

The honor of the discovery belongs to Mr. Roger Sherman Hoar, an authority on constitutional law, who in the summer of 1913, was accidentally confronted by the first blue dandelion of which it is recorded that mortal eyes ever looked upon. Withholding tidings of his treasure trove until he could startle botanists all over the world by presentation of specimens raised by himself, Mr. Hoar carefully preserved and planted the seeds. But to use his own words: "the next summer neither the seed nor the orginal plant came up and the blue dandelion was lost to the world."

Disappointed but not discouraged, Mr. Hoar with the true spirit of scientific investigation, did not relax his pursuit until, in three widely separated parts of the country, he had found other specimens of the blue dandelion. His account of the extraordinary discovery was then submitted to the *Atlantic Monthly* but was not given to the world until the editor, realizing the great importance of the subject, employed what appeared to him to be the best method of convincing himself of the existance of blue dandelions. And in a letter to me he declares he "has both seen and handled them."

As Mr. Hoar, warned by his first experience, has now taken all necessary precautions to ensure successful propagation, there should be available now a quantity of seed for presentation to eager amateur and scientific wild flower collectors. Those who are interested are advised to write the editor of the *Atlantic Monthly*, Boston, Mass.

BOTANY FOR BEGINNERS—VII

By WILLARD N. CLUTE.

WHEN the beginner takes up a scientific key, it is enough for him if he is able to trace his plants correctly. He rarely bothers about how the key is constructed or what characters the maker seized upon to break up the world of plants into smaller and more manageable groups. As a matter of fact, it is of little consequence what distinctions are used, provided always that they unerringly refer each species to its proper group. In a key to the common lobelias, for instance, it would be quite sufficient to use "flower scarlet" to distinguish the cardinal flower from its relatives, but the same distinction could not be made among the violets because there are no red species. Nor would such a division answer for large groups since it would place entirely unrelated forms together.

In selecting distinguishing features for their groups, the key-makers pretty generally adopt such marks as will place related plants together, but the trouble is to hit upon characters that will indicate relationship. To group together all plants possessing palmate leaves would be a mistake, for single plants in any natural group may possess such leaves. Characters taken from the flowers, however, are more certain. It is a commonplace to say that entire families have the same type of flower. We see this in the mints, lilies, roses, peas and mustard families, to mention only a few; we therefore find the main divisions of the keys depending on some character of the flower.

Upon examining a number of flowers, we find that they fall into two well-defined groups according to the number of the parts in each floral set. The numbers are three, four and five. The number of parts might seem to be an unstable thing to base a division upon, but the fact is that these numbers are practically unvarying in each kind of flower, and that other characteristics, as well marked, accompany them. For instance, the three-parted flowers have a single seed-leaf, scattered vascular bundles, and parallel-veined leaves, while the others have two seed leaves, bundles in circles, and net-veined leaves. Such a distinction, therefore will divide the flowering plants into two distinct groups, which are commonly called monocots and dicots according to the number of seed leaves they possess. Probably all can look back to their early days of botanizing and recall how carefully they read the distinctions between monocots and dicots in their key, and how after a few weeks of such investigations they recognized the differences at sight and started with the group to which the specimen in hand belonged. Older students naturally recognize lesser groups in the same way and begin still farther along in the key.

A favorite distinction depended upon to separate the large plant groups into smaller ones, is the nature of the corolla. In some plants the petals are united into a saucer, tube or cup, while in others they are entirely separate and free. The ovary also offers easily recognized distinctions, sometimes being borne within the flower and sometimes appearing to grow below it. The important fact is, that following such divisions we find our groups essentially alike. The flowers often become irregular by having some petals of different size from the others, and these latter almost invariably have the habit of turning sidewise. Their stamens are also great-

ly reduced in number, often only one to a flower. By the time we have used these distinctions for breaking up large groups into smaller ones, we find that the plants in each division begin to have recognizable resemblances and from this point on the key-maker selects anything that will serve his purpose for further segregations. Among other things, the number and position of the stamens, the number of carpels, the position of the leaves on the stem, the number of seeds, the color of the flowers, and the shape of the leaves are favorite characteristics.

The final arrangement of all these groups is as near as a linear sequence as it can be made, but since evolution has produced types of many kinds, such a sequence is but an approximation. It is the custom to place the monocots first and the simplest dicots next to them, though it is now known that monocots as a group are more complex than these latter plants. In deciding what are or are not simple types of plants the flowers are again considered. Those with separate petals or none at all, with many stamens and carpels, with regular flowers and superior ovaries are regarded as simple types, while the highest have united petals, few stamens and carpels, irregular flowers and inferior ovaries. According to this the dandelion is one of the highest types. Consult almost any kind of a key and the dandelion will be found to end the list.

The main difference between a scientific key and one that arranges plants according to color, or habitat, or time of flowering, is that the scientific key is more exact and invariably groups related plants together. When one traces his plant by a scientific key he steadily moves toward that part of it in which all the plant's allies are found, and is helped in his progress by the opportunity to compare his specimen with its relatives. By so doing, he gains much more than the name

of his plant; he also gets a working knowledge of the structure and relationship of the whole plant world and acquires the ability of identifying unknown species with rapidity and ease.

THE LIFE OF A BOOK

A book is in many ways like a plant. It appears, fresh and vigorous, runs through a life-cycle of varying length and finally dies and disappears or perchance becomes a fossil on the shelves of the second-hand dealer. One unaccustomed to the methods of publishers is apt to regard a book somewhat as he does a loaf of bread, to be had at almost any time and anywhere upon demand, but books are not produced in that way. They appear in editions which might be likened to a crop of plants. A book-crop may yield 500 or 1000 volumes and when these are used up no more are commonly to be had. The book turns out to be an annual and the publisher usually declines to sow another crop of the same kind by bringing out a new edition.

Occasionally a book takes with the public and becomes a perennial. Edition after edition is demanded but just how rarely this is the case with scientific books one may discover for himself by looking for second editions among the books on his own shelves. There are, however, even a few century-plants among the books. The dictionary is a good illustration. The old editions die, but new ones constantly spring up from the parent stock.

The evanescent character of most books, therefore, makes it desirable for one who decides to buy a particular example to get it at once, otherwise he may never possess it or if by chance he does secure it, he may be obliged to take a second-hand copy often at a large increase in price.

The great war made the book situation still more serious by doubling and trebling the cost of everything that goes to the making of books. In consequence the publisher can no longer take a chance on a small edition of a new book. A failure costs too much. He must now be assured in advance that a work offered for publication will sell into the thousands. The decision as to what is or what is not a good book is thus shifted from the public to the publisher who is as likely to guess wrong as right, and so suppress many worthy manuscripts. Moreover, high costs require that stocks be turned over quickly. A really valuable book may sell so slowly that a new edition is unprofitable and it is regretfully allowed to go out of print. Practically the only exception to this rule are school-books which, being bought in larger quantities usually have a longer run.

Twenty years ago, there was a lively interest in nature and nature-books, but the moving pictures have largely taken the place of reading and the automobile has made botanical excursions quite plebeian. The old-fashioned individual who still finds entertainment in field and forest is likely to be astonished when he inquires for the books relating to botany that he used to know. Nearly all have disappeared. Mrs. Dana's "According to Season," Mrs. Creevey's "Recreations in Botany," Going's "With the Wildflowers," Henshaw's "Mountain Wildflowers," Lounsberry's "Guide to the Wildflowers," Gibson's "Blossom Hosts and Insect Guests" and a host of other "how-to-know" books have gone out of print. Even Britton's "Manual" has gone the way of all things and Underwood's "Our Native Ferns and their Allies"—the latter after running through six editions. In fact there has been a great mortality among fern-books. Waters' "Ferns," Beecroft's "Who's Who among the Ferns," Eastman's "New

England Ferns," Dodge's "Ferns and Fern-allies of New England," Slosson's "How Ferns Grow," Woolson's "Ferns," and Price's "Fern Collectors Handbook" all well known a dozen years ago have disappeared. Indeed, the only books in this class left are Parson's "How to Know the Ferns" (\$2.50), Tilton's "Fern Lovers' Companion" (\$3), Clute's "Our Ferns in their Haunts" (\$3) and "Fern Collectors' Guide" (\$1).

Not only has the mortality among the older books been great, but few new ones have arisen to take their places. Among popular handbooks, however, we still have Dana's "How to know the Wildflowers" (\$3), Lounsberry's "Southern Wildflowers and Trees" (\$5), Peterson's "How to know Wild Fruits" (\$2), Mathews' "Field-book of American Wildflowers" (\$3.50), and Armstrong's "Western Wildflowers" (\$3.50). Somewhat similar in nature are Chase's "First book of Grasses" (\$1.25), Georgia's "Manual of Weeds" (\$3), Hitchcock's "Grasses" (\$2), and Dunham's "How to know the Mosses" (\$2.50).

Among Manuals there is still left that standard work Gray's "Manual," 7th edition (\$3), though we still regret the passing of Wood's "Class-book." Small's "Southern Flora" (\$4) is standard for the Gulf States and Coulter & Nelson's "Rocky Mountain Botany" (\$2.60) for the mountain States. Gray's "School and Field Botany" (\$1.88) is valuable for the number of cultivated plants it includes and Wood's "Botanist and Florist" (\$2) now nearly out of print is much like it. Though Britton's Manual is out of print, his "Illustrated Flora" in 3 volumes (\$13.50) which figures all the plants of eastern America is still on the market.

Books devoted to trees and shrubs are still plentiful. Emerson and Weed's "Our Trees; How to know Them"

(\$3.50), is one of the best for beginners, and Lounsherry's "Guide to the Trees" (\$3) is another. Keeler's "Our Northern Shrubs" (\$3) and "Our Northern Trees" (\$3) are also excellent. Apgar's "Shrubs of the United States" (\$1.60) includes cultivated as well as wild species and Trelease's "Winter Botany" (\$1.25) and "Materials for Decorative Gardening" (\$1.25) include the trees as well. Blakeslee and Jarvis' "Trees in Winter" (\$3.50) is good for winter botanizing.

For those interested in economic botany, Sargent's "Plants and their Uses" (\$1.60) and Saunders' "Useful Wild Plants of the United States" (\$3.50) are recommended. To these may be added Harshberger's "Pastoral and Agricultural Botany" (\$2), and Robbins' "Botany of Crop Plants" (\$2.25). Sturtevant's magnificent volume entitled "Notes on Edible Plants" is the last word in this line. It is published by the State of New York. Lovell's "Flower and the Bee" (\$2) may be added for those interested in pollination. For the myths and legends connected with the plants one should consult Beal's "Flower-lore and Legend" (\$1.40) and Skinner's "Myths of Flowers, Fruits and Plants" (\$1.50).

The standard dictionary of plant terms is Jackson's "Dictionary of Botanical Terms" (\$3.50) though Henderson's book of the same name (\$4.50) has various features to recommend it. Zimmer's book, also with the same title (\$2) is a good but cheaper book and Harvey-Gibson's "British Plant Names and their Derivations" (\$1) and Lindsay's "Plant Names" (\$1.25) are desirable.

Garden books, possessing somewhat more of a utilitarian character, are rather more numerous than other plant books. Their contents are naturally varied and it is difficult to make a representative selection. Three that may be recommended

for the flower-gardener are Keeler's "Our Garden Flowers" (\$3), Saylor's "Book of Annuals" (\$1.20) and McSelf's "Hardy Perennials" (\$2.75). Sedgewick's "Garden Month by Month" (\$7.50) is a very comprehensive work and Thomas' "Book of Hardy Flowers" is the most comprehensive we have seen but unfortunately this last is now out of print.

Many of the books mentioned in the foregoing have been on the market so long that it is likely that they are fast nearing extinction. All were in print, however, as this was written. Before another gardening and botanizing season occurs, it is probable that several of these will be no more. Those who have planned to own copies of them, should lose no time about it.

THE LARGEST FLOWER IN THE WORLD

By H. E. ZIMMERMAN.

CAN you imagine a blossom as large as a carriage wheel? On the island of Mindanao, one of the Philippine group, such a flower was found by some explorers some years ago. Far up on the mountains of Parag, 2500 feet above sea level, they were wandering when they came across some buds larger than gigantic cabbage heads. Greatly astonished, they searched further, and presently discovered a full-blown blossom, 5-petaled, and 3 feet in diameter. It was carried on low-lying, luxuriant vines. The natives call it "Bolo." It was impossible to preserve it fresh, so the discoverers photographed it and kept a few of the petals to press. A single flower weighed 22 pounds. It was afterwards found to be a species of *Rafflesia*, first found in Sumatra and named after Sir

Stamford Raffles. The new flower was called *Rafflesia Schadenbergii*, in honor of its discoverer, Dr. Schadenberg.

The immense flower is composed of five round petals of reddish green color, each measuring a foot across. These are covered with numerouse irregular yellowish-white swellings. The reflexed petals surround a cup nearly a foot wide, the margin of which bears the stamens. The cup of the *Rafflesia* is filled with a fleshy disk, the upper surface of which is covered with projections like miniature cow horns. When free from its contents the cup will hold about twelve pints of fluid. The flower is very thick, the petals being three-quarters of an inch in thickness. Its striking beauty is spoiled by its intolerable odor which pollutes the air for many feet around it. It is also a parasite, growing on the trailing vines which are found in great abundance in tropical forests.

OUR NATIVE CYCAS

By MRS. W. D. DIDDELL.

MOST people are probably familiar with the so-called sago palm (*Cycas revoluta*) but less well known is our native Cycas, the *Zamia integrifolia*, or coontie, of the Seminole Indians. The Cycadaceae is a most interesting family, the plants having stems and leaves like a palm but coiled in the bud like a fern. It has the flowers and fruits of the pine family and might be said to be the connecting link between the pines and the palms.

The *Zamia* or coontie is found in South Florida and is the only Cycas native to our Southeastern States and so far as I know of the whole United States. It grows in low moist lands and is found extensively in the everglades where the

root which contains much starch is esteemed as an article of diet by the Seminole Indians. The short stem is underground so that the leaves come up on long petioles. The leaves are close-set and numerous giving the plant a bushy appearance much like that of the cinnamon fern which it also resembles in height though it is much heavier appearing owing to the greater number of leaves.

The coontie is dioecious and the sterile aments of the male plant resemble far more the staminate aments of the pine trees than they do the pineapple-cheese-like sterile cone of the sago palm. They are about four or five inches in length on short peduncles and are hidden down under the leaves. The large cone of fertile flowers, also hidden among the leaves, is not much larger than a large pine-cone but unlike it and very heavy. It is composed of large hexagonal scales, dark brown in color, connected by a long filament with the central rachis.

The irregularly shaped fruits are packed under the scales around the rachis far more tightly than the proverbial sardines in a box. The fruits, flattened on the sides where they lie together, and deeply grooved where they overlap the filament connecting scale and rachis, consist of a round seed with a hard outer covering surrounded by thick albumen.

This interesting plant is cultivated throughout Florida as an ornamental though the farther north one goes in the State the less it is seen. Owing to the quantity and excellent quality of the starch to be obtained from the stem, it should be of value commercially but like a great many other plants of economic value it is neglected because none take the trouble to exploit it.



NOTE *and* COMMENT



ABNORMAL GROWTH OF POISON IVY.—One normally expects the poison ivy (*Rhus radicans*) in the northern part of Michigan to occur as a small shrubby plant, seldom exceeding a foot in height. The climbing form is apparently absent. The nearest approach to it was discovered on July 28, 1922 along an open roadway close to Temperance Point at the extreme northwestern part of the lower peninsula. Here on the sandy ridges bordering Lake Michigan there are many of the ordinary shrubby plants of *Rhus*, but in one place along a roadway three plants had started to grow the long stem; differing, however, from normal in that this stem went thru vegetation rather than climbing up it. There were trees of white cedar (*Thuja occidentalis*) available, but, altho one passed a trunk of *Thuja* and had aerial roots attached to it, the direction of growth was parallel with the ground. Continuing thru a thicket of *Thuja* seedlings these stems of *Rhus* remained approximately in the centers of the plants out to the edge of the thicket. There the stem dropt to the surface of the ground and proceeded. In so doing, it grew thru a meadow and out into a boggy beach pool where *Rynchospora* was particularly abundant. At the time of observation the outermost part of the plant was actually on water soaked ground, altho at no place underneath the surface of the water. Apparently, however, it was growing with normal vigor and ordinary leaves and flowers.

were spread along it in the usual manner that they would be on an upright stem. The evidence seemed to be that it was an ordinary aboveground stem rather than an underground stem and yet it might have been that the very wet soil in the vicinity had forced the plant to develop its rhizome out in the air.—*Frank C. Gates.*

LARGE ELDER-BERRY FRUITS.—Among the new plants imported by the Government for distribution to experimenters, are specimens of the common European elder-berry (*Sambucus nigra*) with fruits three or four times the size of ordinary elder-berries and very sweet and juicy. When ripe they are greenish-golden instead of blue-black. The discoverer of this sport gathered twenty-one pounds of fruit from a specimen the second time it fruited. It is probable that all of our wild fruits could be improved greatly by selection and cultivation if desired. The common wild cherry (*Prunus serotina*) has thus been made into an edible form in parts of the tropics. In the case of our native elder-berry (*Sambucus Canadensis*) nobody seems to have thought it worth experimenting with, but all wayfarers know that the fruit presents a wide degree of variation and therefore offers many points of departure for making improved varieties. All that is needed to produce a commercially valuable fruit is somebody with time and patience enough to carry out the work.

VEGETABLE BROOMS.—A year or so ago, the writer of this paragraph picked up in one of the cliff-ruins of our Southwest, a broom made of the stem and leaves of a yucca plant. The specimen had laid there for possibly a thousand years since it dropped from the hands of its Indian owner. The broom is no modern invention, but long before there were manufactured brooms, the savages utilized various plants for cleaning up as we now use the manufactured article. Those

who lived where brooms grew ready to hand were, however, more fortunate than the others. A modern vegetable broom has recently been reported from Japan. It is said that in that country our common "standing cypress" "burning bush" or World's Fair plant" (*Kochia scoparia*), or a plant so much like it that passes under its name, has branches so tough and resistent, that after they have served their time as ornamental plants they are pulled up and employed for more useful purposes.

THE BUTTERWORTS.—A plant sent for name by a reader in South Carolina proves to be *Pinguicula elatior* a cousin of the plant of North America and Europe known as the butterwort or bog violet (*P. vulgaris*). The Carolina plant is also well entitled to the name of bog violet since its flowers are the size and color of violets, are turned sidewise on the stem, and posses a spur projecting backward. The spur, by the way, is rather slender and pointed and reminds one of the long-spurred violet (*V. rostrata*) more than it does the other species. The leaves of all the pinguiculas are greasy to the touch and many small insects become mired in the excretion which is supposed to digest them for the use of the plant. A yellow-flowered species common on the Gulf Coast, and there known as buttercup, is an expert insect-catcher but its flower-stalks are so greasy as to make them unfit for bouquets. *Pinguicula vulgaris* is spread irregularly across the northern hemisphere and becomes rare southward, but in the latter region it is well represented by four other members of its tribe.

JAPANESE WATER-PLANT.—Whenever one has new swindle to put over, he always gives his project some impressive name. A few years ago, there was an epidemic of Japanese air plants which were not plants at all, but colonies of

a small water animal which had been dyed green to resemble a plant. Now comes the Japanese water plant which is described as a triumph of plant life that requires nothing but water and sunshine for growth. A small packet of seeds is offered for 25 cents and guaranteed to produce "an ideal fern for the table." The seeds, however, are those of the edible lentil which can be purchased of the grocer for less than 25 cents a quart, but those who like to be humbugged will probably prefer the neat little packet and consider the fairy story that comes with it, worth the price.

STERILITY IN LILIES.—Those who cultivate the lilies know that these plants seldom produce seeds. It is not too much to say that the seeds of some kinds have never been seen. It was the opinion of Darwin and other early botanists that the production of bulbs and bulblets in these species in a measure compensated for the lack of seeds. Others assumed that the lack of seeds is to be attributed to the exhaustion of the plant's energy in producing bulbs. Some time ago, A. B. Stout made some investigations of the subject and concluded that both opinions are erroneous and that lilies do not produce seed-pods for the simple reason that their own pollen and frequently the pollen of closely related individuals is impotent on their own stigmas. Lilies are capable of producing abundant seeds when properly pollinated and will usually do so when pollinated with pollen from entirely different species. There are many other plants whose sporophylls present similar conditions. Some plums, pears, and apples are self sterile. Though such difficulties of pollination have long been known to exist, nobody has suggested any reason for the curious fact that after a species has originated, some defect in its pollinating mechanism renders it likely to disappearance through failure to reproduce itself. The production of bulb-

lets, which are essentially detached buds capable of growth into new plants may, after all, be one way in which the species defends itself from extinction.

GARDENING IN ONE'S SHOES.—A good many people, without knowing it, maintain a considerable garden in their shoes. Certain tiny plants which thrive in warm, moist places may multiply there and in time make their presence known by odors that are far from pleasing. Scrupulous cleanliness is often counted on to keep one free of such pests, but he may become infected again and again, especially if he patronizes a cobbler. Even trying on a pair of new shoes that have been tried on by someone else may produce trouble. People who wish to be rid of such gardens are often advised to bathe the feet in water containing a small amount of formaldehyde, but a much better scheme is to shake into the offending shoes, a little powdered boric acid now and then. The acid may be obtained at any drug store and is absolutely harmless—except to the pesiferous plants. Copper sulphate or even ordinary sulphur may be used but these may cause stains on light shoes while boric acid will not.

LICHENS.—No climate is too wet, too dry, too hot or too cold for lichens of some kind to flourish. The talus blocks of rhyolite exposed to the cloudless glare of the sun in a region with an annual rainfall of no more than eight inches are covered with drouth resistant lichens as closely aggregated as they can crowd, while the desert below sea-level, with a rainfall of less than two inches has a plenitude of rock and earth lichens which thrive in the heat as great as the earth affords. On the other hand, the pinnacles of the great Puget Sound volcanoes or the sky-splitting peaks of the Alps are thickly crusted with layers of dark lichens or swathed in leathery blizzard-defying *Gyrophoras*. From the

farthest north lands seen by Peary in his trip to the pole a bit of rock was sent me on which the lichens left no unexposed surface, while on many seashores, rocks submerged at every tide are equally well-covered by these strange plants. The lace lichen, (*Ramalina reticulata*) largest and bulkiest of North American lichens reaches its maximum development with a rainfall of about sixteen inches, while in the forests of the outer coast range of Oregon or the mountains of Java, where the rainfall is measured with a yardstick, *Usnea longissima* justifies its name, attaining at times a length of 10 meters (thirty-two feet).—Albert W. C. T. Herre in *Scientific Monthly*.

RANGE OF MAGNOLIAS.—The species of *Magnolia* are regarded as decidedly Southern in distribution. The closely related tulip tree (*Liriodendron tulipifera*) pushes northward into southern Michigan and the cucumber tree (*Magnolia acuminata*) is reported in the books to range from New York to Illinois and southward. Although the natural range may be as indicated, it by no means indicated the area in which species of *Magnolia* are hardy. The umbrella tree (*Magnolia tripetala*) which in nature ranges no further north than the Ohio river, thrives in Joliet's Arboretum in Northern Illinois and this year produced several blossoms. The writer of this paragraph recently noticed a fine old specimen of *Magnolia acuminata* at Whitehall, Michigan, which is well north in the State and more than a hundred miles beyond its natural habitat.

PHLOX STELLARIA.—In reply to the query regarding the habitat of *Phlox stellaria*, Dr. Frank T. McFarland writes: "About ten years ago I made several trips along the Kentucky river and I ran across a phlox which I identified more or less doubtfully as belonging to this species. I paid no further at-

tention to the identification until the 17th of May of this year when Doctor Wherry from Washington was here looking for the same plant. We made the trip to Camp Nelson where we found it again. In the opinion of Doctor Wherry this plant is undoubtedly the true species." This at least gives one definite location for the plant. All the others in which it is reported to grow, either show no trace of it or the plants seem more properly referred to *Phlox bifida*.

YUCCA.—In Florida the yucca is known as Spanish bayonet. At St. Augustine they have huge old plants, very tall, to guard the gates of the city, and in the northern part of the State you see them occasionally. The species was probably introduced into Florida by the early Spanish settlers as we had several at our home, St. Nicholas, formerly an old Spanish fort across the river from Jacksonville. In Arizona the yucca is often known as "amole." In this species the plants are low and the foliage dull colored and hairy, but the flower stem is the same—very long and covered with dozens of white waxen lily-like flowers and followed by large and curious seed-pods. Here the plant is used in the manufacture of soaps and washing-powder for the head. I do not think the root is edible or the Mexicans would make use of it for that purpose.—*Mrs. O. A. Budd, Prescott, Ariz.*

TRADESCANTIA.—The *Tradescantia* is also known as spider-wort, Job's tears and widow's tears, from the three petals dissolving into a jelly-like "tear-drop," after having been in bloom but a day. The varieties found here (north-east Texas) are low-growing and thick-stemmed, producing large heads of bloom. I recently counted sixty-five buds on a single stalk. I have never seen them advertised in catalogs in any colors but blue and white, but here we find blue, purple-blue, and the softest shades of rose and lilac, but no white.

The foliage is grass-like, dark green and somewhat rough.—
Florence Hartman Townsend, Rockwell, Texas.

BACK NUMBERS WANTED.—The State Normal School of Peru, Nebraska, needs No. 1 of Volume 25, No. 3 of Vol. 26, and No. 2 of Vol. 27, this magazine, for completing their volumes. Any reader who does not care to preserve his copies will do a favor by forwarding the desired numbers to the school. Our supply was exhausted long ago; in fact we print so few extras that each issue is soon out of print. We have only 14 sets of the first 25 volumes remaining and the price has advanced to \$20 a set. The four additional volumes, bringing the set up to date cost \$6. There are ten sets of the first 22 volumes at \$15 and this is the extent of our supply. It is the part of wisdom to order at once.



EDITORIAL



It is a long way yet to winter and the end of all ordinary botanizing, but the time when we begin to withdraw indoors and give more attention to books and writing is not so far away. Now, therefore, is the time to set down in permanent form an account of the season's experiences. A good many people who read this statement may be inclined to think that they have no botanical experiences worth recording but this is probably incorrect. If you have seen no plant or flower under conditions that made you exclaim over it, if there have been no occasions when the presence of flowers have added to your enjoyment, if you have found no flowers new to you nor met with familiar flowers in new habitats, if you have not been impressed with new beauties in some common species, then you may perhaps be justified in asserting that you have nothing to write about. Still, good botanical writing does not consist entirely or even chiefly of descriptions. It deals more with ideas and impressions. It is a failing of the novice to think that plants must be described in technical language. He may be interested merely in the brilliancy of a certain flower, but he thinks it necessary to mention the linear-lanceolate, dentate, apiculate, chartaceous and pubescent leaves and may even extend his technical remarks to the flowers themselves. But that is not the way we describe a new flower to our neighbor over the back fence and it is not the way to describe it in print unless some question of its exact specific or generic relationship is up. Nor are articles which are largely

catalogs of names desirable. In describing the flora of a region, to be sure, all the plants may be listed, but when we return from a trip and attempt to give a friend some idea of the flowers encountered, we do not enumerate them all; we only name the outstanding forms which especially attracted our attention and add the reasons why they did so. Something of the same treatment should prevail in our printed accounts. If one examines the writings of Burroughs, Thoreau, Gibson, Van Dyke, Hudson, and others of similar character, to discover what it is that gives permanence to their work, he discovers that aside from the ability to express themselves in pleasing form, it is the ideas they present that attract us. One may conceivably stay at home throughout the year and yet gather a harvest of ideas that will provide a better article than extensive botanizing. We do not, however, mean to imply that descriptive articles are not desirable, but we do suggest that ideas may also be included. Every year we have to return to the writers numerous articles that are too categorical or too descriptive of well known features to suit us, but we have never yet returned an article with ideas in it. And so, just now when we assume that all our readers are planning to send us the results of their season's work, we print these friendly admonitions.

BOOKS AND WRITERS

Well, here we are, back from a month's vacation, to find that the publishers have seized the opportunity to make a lot of changes. * * * After completing 37 volumes, *Horticulture* of Boston ceases to be a trade paper * * * It has been promoted to be a general horticultural magazine under the auspices of the Massachusetts Horticultural Society.

* * * The name it has so long and honorably borne will be retained. * * * It is no reflection on the Society to say that they will have to step lively if they improve the pace it has set. * * * It is our favorite trade paper. * * * One of the literary magazines recently announced the demise of the *Guide to Nature*, but the irrepressible Bigelow says the report is greatly exaggerated. * * * There was a fire in the office, recently but the *Guide* is a regular phoenix. * * * "There was never a brighter outlook than at present," says Bigelow. * * * The *Writers' Monthly* of Springfield, Mass. has enlarged again, adopted a different type-face and made two columns to the page. * * * This is the only writers' magazine that we would subscribe for if we did not get it in exchange. * * * Even the botanically-minded will find it of interest. * * * The "Official Catalogue of Standardized Plant Names" which has been in preparation for a number of years is announced as on the eve of publication. * * * Harlan P. Kelsey, Salem, Mass., has charge of the sales. * * * Five dollars a copy and probably worth it. * * * We shall say more about that when we have seen a copy. * * * A new edition of the "Fern Lovers' Companion" or rather the original edition with a few changes made by the new publishers is now on the market. * * * Little, Brown & Co., have the book. * * * The price has been increased to \$3. * * * A new jacket, with a complimentary notice by the Reviewer gives it a certain *eclat*—if you know what that means. * * * The first number of a new Polish botanical publication has found its way across the Atlantic. * * * Its full title is "Acta Societatis Botanicorum Poloniae" and it is published at Warsaw. * * * The first number is very well arranged. * * * A number of the articles it contains are written in

French and the others have a summary in that language. * * * Walter Stager whose iris book has been favorably received by the public has reissued a small pamphlet on "Hardy Flowering Shrubs." * * * It tells what kind to plant and how to care of them. * * * Dr. E. B. Payson has issued another monograph of western plants. * * * This time it is *Thelypodium* and its immediate allies. * * * Dr. Will Sayer Moffatt has distributed Part 2 of the "Higher Fungi of the Chicago region." * * * It includes the geasters and puff-balls and illustrates most of the species. * * * Of the giant puff-ball, which he calls *Calvatia borista* he says "No specimen of unusual size has been reported from the vicinity of Chicago." * * * Well, it all depends upon one's idea of size. * * * A specimen sixty-nine inches in circumference from this region was figured in *American Botanist* for January 1906. * * * We always thought that was some puff-ball! * * * Dr. Moffatt should read his *Botanist* more carefully!

What one gets out of a garden depends somewhat on who he is. Some get only vegetables wherewith to promote their physical well-being, others return with flowers to minister to their sense of beauty and still others, though these are greatly in the minority, return with new ideas to delight themselves and others. To the latter class belongs Charlotte Rider Lomas the author of "Garden Whimsies" recently issued by the Macmillan Company, who has written an entire book about gardens in general and her own garden in particular without a word about planting, cultivating, or the allied subject that all other authors of garden books feel compelled to put into their volumes. The book does not even contain a description of the flowers usually found in gardens though it deals with all of them. The title of the

book exactly describes it. Here the author has set down with much sprightly humor the ideas suggested by her associations with the flowers. Fact, fancy, suggestion, and opinion are delightfully blended to form a new sort of book that all who possess gardens will enjoy. There are no illustrations; such a book needs none. The price is \$1.50.

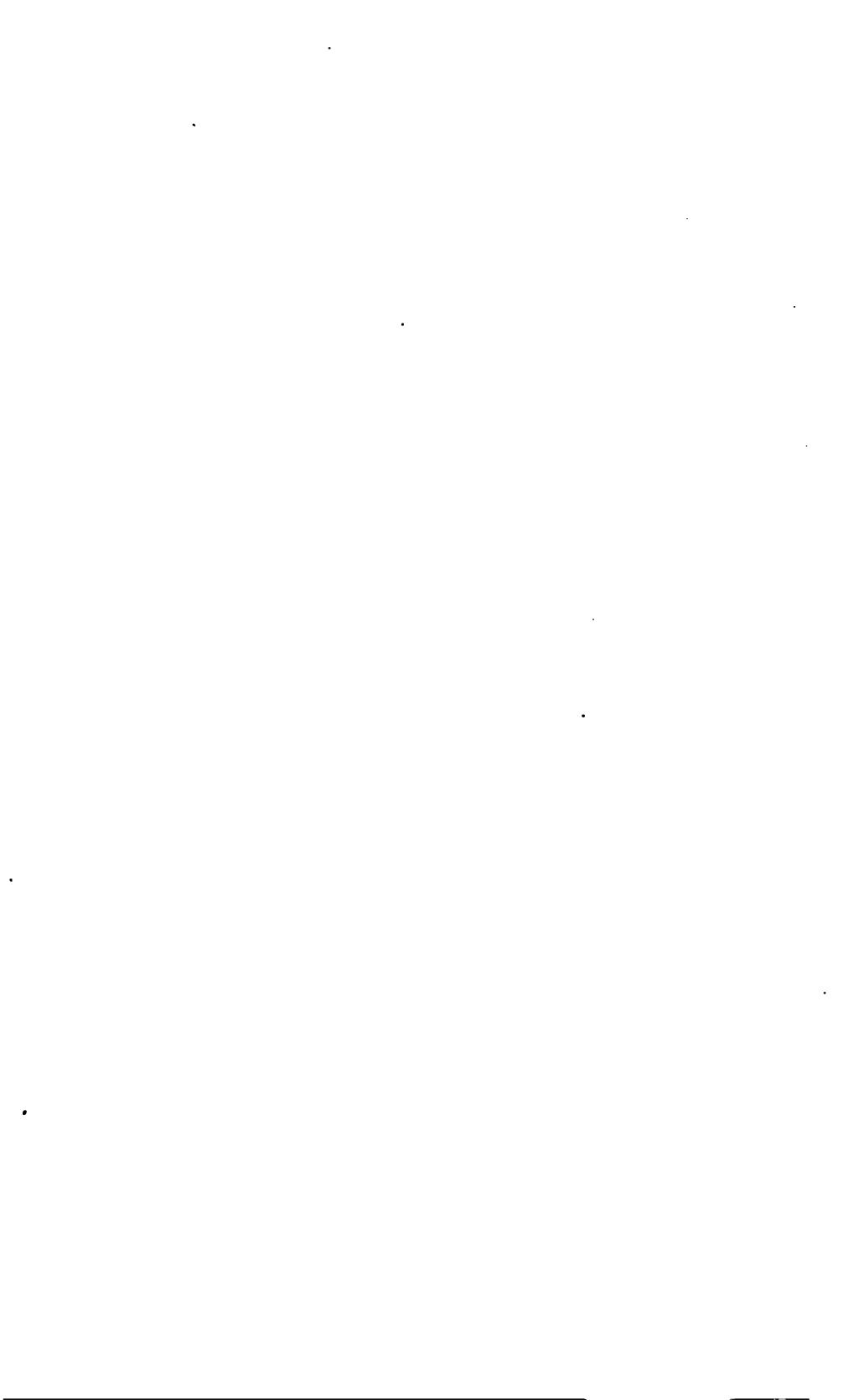
In the "Story of the Maize Plant" Paul Weatherwax attempts to clear up some of the mystery surrounding the origin and distribution of that plant which the first settlers designated as Indian corn, which we commonly call corn and which is more properly known by its aboriginal Indian name of Maize. This largest of the cereals—really a big-seeded grass—is one of America's few important contributions to the staple crops of the world. It appears to have originated somewhere in Central America or Mexico but all trace of its ancestors have been lost. There is a large Mexican grass known as Teosinte which has often been suggested as the plant from which our maize originated but the author concludes that the only relationship between the two is that due to descent from a common ancestor. More than two hundred pages are devoted to other features of maize—the structure and physiology of the plant, the morphology and homologies of the two kinds of flowers, pollination, fertilization, seed formation and even cultivation and harvesting. The ecological and economic aspects of maize are also considered; in fact, it would be difficult to find anything of value about maize that the author has omitted. The book is intended for the general reader and is well and clearly written. There are two colored plates and 172 figures in the text. It is published by the University of Chicago Press and costs \$1.85, postpaid.

A country that is using wood four times as fast as it is being produced is headed straight for trouble, but this is ex-

actly the condition prevailing in America at present according to Arthur Newton Pack, whose book "Our Vanishing Forests" describes the haste and waste with which we are destroying our woodlands and make a strong plea for their greater conservation. Each year we use enough railroad ties to lay 1 track five times around the earth at the equator, the wood pulp used in the newspapers of our country annually would make a strip of newspaper width half way to the sun, and this does not include the paper used in books. Each year the lumber produced would build a double row of five-room houses clear across the continent and back, and each year fire destroys enough forest to build a double row of the same houses from New York to Chicago. Even the props used in coal mines call for two hundred million cubic feet of wood annually. Things have come to such a pass that we are actually importing sawdust from Europe! Few people realize how varied the uses of wood are. The author says "We do not have to go to the lumber-yard to buy wood. We buy it in furniture stores, grocery stores, book stores and drug-stores." Telegraph poles and toothpicks, barrels and crates, buttons, and clothes-pins, crutches and golf-sticks, pencils and rulers, paper and matches, paving blocks and spools, piling and shoe-pegs, tanbark and excelsior, fence-posts and fuel all make a heavy drain on the forests not to mention turpentine and maple syrup, alcohol, drugs, dyes and many others. And the demand is four times larger than the supply! We once had eight hundred and fifty million acres in forest; now more than half of this area has been cleared. The rest is disappearing at the rate of ten million acres annually. Contrary to general opinion, the land thus cleared is not used for agriculture to any great extent. More than eighty million acres of cut-over lands contain only second-growth and cull

trees and another eighty million acres produce absolutely nothing. The author concluded that it is the part of wisdom to reforest these waste lands immediately. With reforestation, "a tree for a tree," protection from fire and a more economical use of forest products it is possible for our country to live within its timber income. The author's style is direct and convincing and the unique illustrations are calculated to arrest attention. It is a book everybody ought to read. It is published by Macmillan at \$2.00.

To one who in the ripening days of August fares through uncared-for country roads, few bushes have more charm than the elder. In every fence corner, bordering the tumbling stone walls, and in unbrageous clumps by the brookside stand these spreading shrubs with dull green foliage and heavy clusters of small purple-black berries. Not seldom wild vines run riot through the gray clustered stems; and the clematis, the traveller's joy, tosses the white foam of its airy bloom over the full fruitage. The elderberry crop never fails. Huckleberries and blackberries, other children of the wastes, may have dried in the droughts of midsummer, but the little elderberries, full of crimson juice, crowd in close cymes on every branch. Pleasant refreshments for him who strolls afield, they may be used in many ways and when other fruits fail may be of no slight importance to the housekeeper. Elderberries make a close second to the best huckleberry pies if they be but skillfully blended with spices. Elderberry jelly is firm and flavorful with a racy tang of the woods; and elderberry wine said to reproduce the bouquet of Frontignac, sparkles through all English story of rural life.—MARTHA B. FLINT.



WILD SWEET WILLIAM.—*Phlox divaricata*



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*All day the blasted oak has stood
A muffled wizard of the wood;
Garland and airy cap adorn
The sumach and the wayide thorn,
And clustered spangles lodge and shine
In the dark tresses of the pine.*

Trowbridge.

OUR NATIVE PHLOXES

By WILLARD N. CLUTE

THE phlox genus may be said to be exclusively North American although a single species of the West extends into Siberia. There are some thirty species of phloxes in the world and all are perennial except the well known *Phlox drummondii* of Texas and adjacent regions. Other species are found in practically all parts of the United States, but the species are most numerous in the West. As regards abundance of individuals, however it would be difficult to find a spot in which they were more plentiful than in the one shown in our frontispiece which was made from a photograph taken in Northern Illinois.

The species illustrated is *Phlox divaricata* often called *P. Canadensis* by nurserymen. This species occurs in most of the territory east of the Mississippi. All of the other Eastern species appear to avoid New England. One or two reach Connecticut but New York or Pennsylvania seem to be *the north-*

eastern limits for most of them. *Phlox maculata* and *P. paniculata*, the progenitors of our garden phloxes are rather southern in distribution while *P. amoena*, *P. ovata* and *P. stolonifera* are disposed to haunt the Alleghanies. *Phlox pilosa*, *P. argillacea* and *P. bifida* favor prairies and dry hills. *Phlox glaberrima* is reported to be a prairie species but it occurs only where the soil is quite moist. *Phlox pilosa*, on the other hand, is found only in dry places and *P. bifida* almost demands sand. The prairie species are fond of growing together in close-set and extensive colonies and when in bloom light up the landscape in a manner well justifying the generic name which means flame.

Phlox subulata is the moss pink, well known for its predilection for rocks and stony hillsides. One of the handsomest species of the Rocky Mountains is *P. Stansburyi* which delights in dry banks in the open sun or light shade. The large magenta flowers are among the largest in the genus. *Phlox Hoodii* is another widespread species that suggests the eastern *P. subulata*. There are a number of other Western forms that are well known but in general they have not impressed themselves upon the attention of the plant lover to a degree sufficient to make them the subject of much botanical discussion. All, however, are so strongly marked with the phlox characteristics as to rarely be mistaken for something else.

BOTANIZING IN SOUTH-EAST GEORGIA

By MRS. MARY W. DIDDELL.

WHEN, not long ago, I had to take a trip beyond the Satilla river which bisects our county about half a mile from my home, I welcomed the opportunity to make a

brief study of the flora along the way. At the County toll-bridge the porch of the bridge-keeper's house was covered with the woodbine which gives our little town its name. At this season it was gay with its scarlet flowers. From the bridge I could see a point down stream where I went last April by boat for the beautiful *Hymenocallis occidentalis*. They always grow in marshes and can usually be reached only by boat at high tide. I secured some eighty bulbs which are now making themselves at home around my lily pool. This is the loveliest *Hymenocallis* I know of. It does not grow large with a thick stem like its now widely-cultivated relative *Hymenocallis Caribbaeum*. It has two or three flowers to the scape. The divisions of the perianth are long and strap-shaped and the filaments are connected for more than half their length by a cup-shaped "crown." Except for the versatile golden anthers the flowers are white and very fragrant.

Afted crossing the bridge the road goes over a mile through a salt marsh. This was formerly a rice-field, but the present owners have allowed the marsh to grow up to saw-palmetto and *Pontederia* with an occasional open pool in which *Nymphaeas* were growing. Great numbers of birds visit the marsh on their annual migrations. As we rode along a three-foot alligator crossed in front of us and slithered into a pool below the road. Farther down the river are large areas of thick swampy woods full of deer, turkey, and wild-cats. It is a paradise for botanizing but not even the possibility of finding a *Gordonia pubescens* would take me there, for rattlesnakes and the equally deadly cotton-mouth moccasons also abound.

After leaving the marsh the road turned off through pine flat-woods, mostly second-growth pines sparsely scattered owing to the nefarious practice of "boxing" young trees. Every-

where under the pines were little *Pinguiculas*, mostly purple varieties, ranging from deep mauve to nearly white with occasionally the rarer yellow *P. lutea*. In all the streams and roadside ditches the pinguicula's aquatic relative, the yellow-flowered bladderwort (*Utricularia*) was to be seen. There was also a yellow-flowered legume which I took to be a *Crotalaria*, and everywhere the yellow-flowered St. Peter's-wort (*Ascyrum stans*). Its relative the pink *Elodea* I have seen occasionally in moist places, but it is not common like the *Ascyrum* and the *Hypericums*. Scattered in low places were large clumps of pitcher plants (*Sarracenia*) also called trumpet leaf and huntsman's cup. The flowers, with large umbrella shaped stigmas, are called watches. So far I have only found the two yellow-flowered varieties here.

The numerous small swamps or "bay-heads" through which the county road passes holds much of interest. They are usually composed of a dense growth of bay-trees, cypress, sweet gum, magnolias, sweet olive, and gall-berries with other less common varieties according to location. Growing along the edges where the ground is moist but not wet, are usually to be found large clumps of *Baccharis halimifolia* which in October and November are literally covered with the cottony white blossoms. This species has the distinction of being our only Composite to attain tree-like proportions.

In the wettest places in the bay-head are purple and yellow *Iris versicolor*, (I have looked everywhere for the loveliest, *Iris hexagona*, but haven't found it yet,) *Pontederia*, *Sagittaria*, and bladderwort and in the open water great masses of the dainty parrot's feather (*Myriophyllum*.) I do not know of anything lovelier than this latter plant. It is easy to transplant and I have quantities of two varieties growing around my lily-pool. Nor must I forget the lizard's tail

Saururus cernuus) found wherever the ground is wet, with row-shaped leaves and terminal spikes of white flowers drooping over at the tips.

In the most interesting swamp we passed, I found a number of specimens of an *Aesculus* with palmately divided leaves composed of five leaflets slightly drooping on long red petioles.

The bright-red terminal flowers were arranged in threes on red peduncles. The numerical scheme of the flower is unusual, there being a five-toothed calyx, four petals and seven excluded stamens. There were several stems thrown up from a creping red rootstock, and most of the plants were bushy in appearance and not more than four or five feet high, though back in an open place in the swamp I saw a tree fifteen or twenty feet high, of loose open habit and every branch crowned with crimson flower-spikes.

Close by a little bridge were tall, slender yaupon holly trees and in a tangled mass over all climbed blossoming bamboo vines (Southern smilax) and *Ampelopsis arborea* just putting out its bronzy leaves which later turn a lovely iridescent green. I do not know of a common name for this latter vine. The flowers are inconspicuous and the natives confuse it with a trumpet creeper (*Bignonia*) which is very unlike it, as this has delicate compound leaves of a very different shade of green from the once pinnate leaves of the creeper.

In another swamp, we found numerous pink azaleas almost done flowering and the graceful fringe tree (*Chionanthus virginica*) which at a distance appeared to be a cloud of white.

Almost at our journey's end was an open glade covered with large clumps of scrub palmetto and several small cabbage palmetto. The cabbage palmetto is very slow-growing so that while not over eight or ten feet high specimens of they were probably more than twenty years old. The

remain on for several years before falling away and the young trees have a much greater circumference than the old ones. In South Florida the young leaf-bud is dug out of the top of the palmetto and cooked much the same as cabbage. It is ivory-white and very tender with a delicious nutty flavor. No picnic was complete without a pot of "cabbage" cooked on the spot in an iron pot brought for the purpose, especially when it was a Thanksgiving picnic and a brace of squirrels was added to the pot. If there is anything anywhere that tastes any better, I should like to find it.

THE ARBORESCENT FLORA OF MIDWEST FARMSTEADS

By T. J. FITZPATRICK

WHILE making a canvass of Buffalo county, Nebraska, during August 1922, for the purpose of eradicating the common barberry, the writer became interested in trees and shrubs usually planted in rural dooryards. Buffalo county is situated on the north bank of the Platte river, near south central Nebraska, in the semiarid region. The rainfall is about 25 inches per year as an average, with years of much less as was the year 1922 when the amount was about 19 inches.

The arborescent flora about or in the dooryards is a planted one; the purpose is to secure shade and ornamentation. The results obtained depend entirely upon selection, location, and care, as well as skill in planting. Many dooryards were seen that were absolutely without trees or shrubs of any kind. A little buffalo grass or other native grasses, a few ruderals or native plants of the nearby prairie made up the vegetation of the yard. In other words the dwelling had been erected

on the native sod and the vegetation present was a remnant of the original one along with a few rederals in competition with human occupation. Under such conditions during the sunny days of the long summer drought there was a maximum of dessication which produced an environment unfavorable to either plant or human occupations. As a consequence abandoned farmsteads were much too frequently in evidence for the good of the former occupants or of the present community.

The general favorites among the shrubs are lilac, spiraea, matrimony vine and rose, about in the order named, though the choice of the pioneers was evidently lilac and matrimony vine, the spiraea being a later introduction. Most other shrubs were of much later planting, some only in recent years. The early trees were cottonwood, box elder, white elm, soft maple and ash. Later plantings included juniper, black locust, black walnut, hackberry, catalpa, mulberry, osage orange, etc.

A few groves of considerable extent were observed on the prairie which had their origin in early plantings, doubtless prompted by a tree-planting statue. Some of these are in excellent condition, having a good location and a suitable selection of trees; others present an indifferent appearance, the location being poor and the trees unsuitable to the environment. In some places the tree plantings were rapidly becoming less in extent, the encroaching prairie taking up the abandoned area. The average conditions are suitable to tree growth but the extremes prohibit such vegetation.

Lilac is the shrub most frequently seen in the region under consideration. It was planted as a hedge along the border of the dooryard or a single shrubs or clumps almost anywhere in the yard. When planted as a hedge it may oc-

cur along any one or more of the four sides or occasionally it appears as a wing out from any corner of the house. All of the old plantings seem to be those with broadly ovate leaves and blue or purplish to white flowers (*Syringa vulgaris*). Some of the older and many of the later plantings have narrowly ovate leaves and white flowers (*Syringa persica*). In Buffalo county the lilac rarely grows higher than six to eight feet. Often it is pruned to give a desirable ornamental hedge effect. It is hardy and does well in this region but during the present drought it was noticeable that conditions had nearly reached the limit for its continuance. No evidence was found that any had succumbed during a previous drought.

The lilac was evidently much in favor with the early pioneers. This is apparent not only from the age of the bushes but also from their occurrence about long-ago abandoned house sites. In many cases practically every trace of a pioneer dwelling had disappeared save for a single clump of lilac. Sometimes nothing was to be seen of the dwelling save a scarcely visible quadrangle, a remnant of the foundation, or more or less of a depression indicating the former cave or cellar; but the lilac remained as a solitary sentinel of the past and forgotten. In one instance I found a lone clump of lilac in the midst of a cornfield. It was the last trace left of an ancient dooryard.

Spiraea or bridal wreath is the next shrub in frequency and seeming favor. It is planted singly and as a hedge; the hedge being planted as a border and the shrubs in any convenient opening. The shrub is well adapted to this region, showing little if any discomfort from the drought. The bright green foliage is a welcome sight at any time and the

shrubs are very beautiful during the flowering period. The species usually found seems to be *Spiraea vanhouttei*.

Matrimony vine (*Lycium vulgare*) is a frequently observed shrub, sometimes planted as a hedge, but not often as a single shrub. It does very well but has the bad habit of spreading and in some places becomes a pest. When planted in a row with a low trellis through the middle it makes a rather striking ornamental hedge.

Roses are commonly planted as single shrubs, occasionally in rows or thickets. Two or three species are usually seen, among them the climbing rose, the eglantine, etc.

Cottonwood was often planted by the pioneers either for shade, when only a few were planted, or for windbreaks when many were planted closely in rows. The larger plantings are mainly in the Platte, Loup, and Wood river valleys; only small plantings occur on the uplands. Many of the early plantings are now large trees with forest conditions and the usual undergrowth. The plantings were around or adjacent to the farmsteads and if large extended along the fields adjacent to the highway. The most extensive planting and one of the older ones that I observed was on the south side of the Platte river, southeast of Kearney. Here several closely planted rows for miles flank the highway which runs eastward, the rows gradually thinning down to one before ending. The species usually seen was the western one known as *Populus sargentii*. The cottonwood has some undesirable qualities and does not seem to be much in favor with recent planters in spite of the fact that it grows rapidly and gives considerable shade.

Red cedar (*Juniperus virginiana*) is frequently planted perhaps a few for ornament, but more often in rows, and then less for ornament than as a windbreak. The red cedar does

well in this region, needing but little care to prevent the ill effects of drought. The tree is often badly infected with the fungus popularly known as cedar apples (*Gymnosporangium macropus*). As a result all the neighboring apple trees were found to be badly infected with the cedar rust. The cedar has so many good qualities that the owners feel constrained to retain their trees in spite of its bad qualities. The apple crop however is not seriously considered as the region has not been developed as a fruit country.

Box elder (*Acer negundo*) has apparently always been in much favor as it grows quickly and gives the maximum amount of shade in the least time. It occurs planted as single trees or in rows for windbreaks.

Mulberry (*Morus rubra*) is frequently seen as a door-yard planting, but more often as a hedge or windbreak. The later plantings of mulberry seem to be the French mulberry (*Morus alba*). This one is often planted thickly in a row and kept trimmed down to about four feet in height as an ornamental hedge.

Black locust (*Robinia pseudacacia*) was not often seen but it occurs as a windbreak or as a shade tree. It is very pretty when in blossom but is subject to insect attacks and then is unsightly.

Honey locust (*Gleditsia triacanthos*) is not often planted. This tree has many good qualities and does not seem to be subject to fungus or insect attacks. All the trees observed were fine ones; the dark green foliage presenting a pleasing sight and they were apparently not affected by the drought. This tree should be more frequently planted, using the thornless variety. One farm about eight miles north of Riverdale has extensive plantings of this species.

Common barberry (*Berberis vulgaris*) was not often seen about the dooryards. All that I found occurred as single clumps and in one hedge. Every specimen was badly infected with the black stem rust of wheat (*Puccinia graminis*). The harboring of the common barberry is now prohibited by law in most of the wheat growing states. All the specimens found were dug up.

Japanese barberry (*Berberis thunbergii*) was not often seen about the farmsteads though frequently observed in the towns. This species is now replacing the common barberry in many places.

Green ash (*Fraxinus viridis*) is a frequently occurring tree, being planted either for shade or for a windbreak. During this season it suffered much from the drought.

Plum (*Prunus americana*) is not infrequent about farm-yards. When this species occurs there is usually a thicket of them about the side or end of the yard or in the field adjacent. When a few are planted or if seed are dropped in likely places the number of individuals increase rapidly and spread along the fences or over uncultivated places and thus form the thickets so often seen.

Bush honeysuckle (*Lonicera tartarica*) is not infrequently planted as a solitary ornamental bush.

Mock orange (*Philadelphus coronarius*) occurs occasionally. Its numerous white flowers makes it very ornamental. At other times for lack of care it is an indifferent bush.

Snowball (*Viburnum opulus*) is not uncommonly seen in many dooryards and usually only one or two clumps will be found at any one place.

Privet (*Ligustrum vulgare*) is infrequent and when found it occurs as a hedge. It grows fairly well and when

properly trimmed it gives a pleasing background to proper plantings about the yard.

White elm (*Ulmus americana*) is often chosen as a shade tree and when planted with reference to proper space it develops a fine shade tree with no undesirable qualities. More of them should be planted.

Black walnut (*Juglans nigra*) was observed a number of times. It does fairly well in low places in which there is a deeper soil and more moisture.

Osage orange (*Maclura aurantiaca*) has been frequently planted along the borders of yards or roadsides as a hedge. It is quite effective but has undesirable qualities and is infrequently used.

Soft maple (*Acer saccharinum*) is frequently planted for shade and windbreaks. In the moister situations it does well.

Russian olive (*Elaeagnus angustifolia*) has been frequently planted during the last fifteen or twenty years. It is quite ornamental and seems to resist the drought readily.

Tree of heaven (*Ailanthus glandulosa*) is occasionally planted for shade.

Service berry (*Amelanchier canadensis*) is sometimes planted. Here this species is shrubby, grows in clumps, and usually has the appearance of a hedge.

Hackberry (*Celtis occidentalis*) is not often planted. In the lower situations it does fairly well but grows feebly in the higher and drier places. The leaves are frequently covered with insect galls.

Virginia creeper (*Ampelopsis quinquefolia*) is occasionally planted but frequently occurs spontaneously.

Catalpa (*Catalpa speciosa*) is not infrequent in many parts of the county. The many large flowers make the tree

very ornamental and the numerous leaves gives a dense foliage with much shade.

Choke cherry (*Prunus virginiana*) is occasionally planted and it also occurs spontaneously in border thickets. Here it is usually a shrub and does very well.

Lombary poplar (*Populus dilatata*) is occasionally planted. It does not seem to thrive very well.

White poplar (*Populus alba*). This species was observed about a few farmsteads.

Austrian pine (*Pinus austriaca*) is occasionally planted. The individuals examined were small trees and seemed to be doing fairly well.

Clammy locust (*Robinia viscosa*). A few specimens were infrequently noticed.

Trumpet creeper (*Tecoma radicans*) is frequently seen at some angle of the house or other convenient location.

PLANT NAMES AND THEIR MEANINGS - XVII CRUCIFERAE - II.

By WILLARD N. CLUTE

OUR two species of *Barbarea* have a just renown as antiscorbutics as the name of "scurvy-grass" applied to *B. vernae*, suggests. This is one of the innumerable cresses, in fact it comes pretty near being innumerable all by itself, for of distinguishing adjectives this cress has "American," "Bermuda," "bank," "land," "winter," "Bellisle" and "early." The names for the most part are self-explanatory. "Bellisle cress" is said to refer to the fact that the plant is common at the straits of Belle Isle. This plant's sister species, *Barbarea*

vulgaris is the "common winter cress," "yellow cress," "bitter cress," "rocket cress," "winter rocket," "wound rocket," "Herb Barbarea" and "poor man's cabbage." Even in northern winters this plant remains green which accounts for the name of "winter cress." "Yellow cress" alludes to the numerous bright yellow blossoms.

The rockets are nearly as abundant as the cresses. The "purple rocket" is *Jodanthus pinnatifidus* which is also known as "false rocket" but there seems no need of the distinguishing objective when so many others are false. The true rocket, or at least the first one, *Eruca sativa*, has become sparingly naturalized with us. It is commonly known as the "garden rocket." The "American sea rocket" is *Cakile edentula*, while the "wall rocket," "sand rocket," "cress-weed," and "flix-weed" is *Diplotaxis muralis*. "Flix-weed" seems to have been originally "flax-weed." *Erysimum asperum* is the "prairie rocket," "orange mustard," "yellow phlox" and "western wallflower." Although called "phlox" and resembling the plants of that genus superficially, the flowers are quite different having four separate petals while in the phloxes there are five united.

Erysimum officinale is the "scrambling rocket" but its more familiar name is "hedge mustard," with such synonyms as "hedge weed," bank-weed" and "California cress." The last named is another illustration of the origin of common names. The plant was originally from the Old World, but its being found in California is enough to cause it to be named for that state. *Erysimum cheiranthoides* is the "treacle mustard" or "worm-seed mustard." The second name refers to the use of the plant, or to the reputed virtues of the plant, as an anthelmintic. The first has a curious history. When "treacle" is mentioned a sort of molasses or sugary solution

is usually understood, but "treacle" originally meant sovereign remedy, especially a remedy against poison. It is practically certain that none of the Cruciferae have any such properties but the idea crops out in connection with several species, especially *Thlaspi arvensis*. All the species of *Erysimum* are called "false wallflowers." The true wallflowers are regarded as belonging to an allied genus *Cheiranthus*. The truly true wallflower is supposed to be *C. cheiri*. It was so called because it is fond of growing on walls. The specific name of the "treacle mustard," therefore, would indicate that it has the best right to be considered the really false wall-flower.

The last of the rockets to be listed here is the dame's "rocket," "night rocket," or "sweet rocket" (*Hesperis matronalis*.) The plant is frequently known as "dame's violet," the name harking back to the time when "violet" might mean any conspicuous flower. "Damewort" is supposed to be a still earlier name. The common name is undoubtedly a translation of the scientific one, but there are those who make scientific names to fit the case as there are makers of common ones and someone has suggested that the name is really from *Viola Damascena* and refers to Damascus the plant's place of origin. To this idea the name of "damask violet" gives support. The name of "summer lilac" is quite meaningless. Had it been "spring phlox" it might have been applied with some reason for at a little distance the plants, when in flower, strongly resemble the tall phlox. In Hill's "British Herbal" our plant is called "eve-weed," not in honor of the mother of our race but because it gives off its odor only at nightfall. From the odor, or color it derives the names of "night violet," and "queen's" "night-scented," "winter" and "rogue's gilliflower." The word "gilliflower," it may be added, is said to

have been derived from *Caryophyllon* the Greek name for clove tree and to have come down to us through the French *girolfe* and Middle English *gellofre* or *gelofer*. The plant commonly called "gilliflower" and with more reason, is the "clove pink" (*Dianthus*.) Our species seems to have fallen heir to the name by reason of its fragrance. The name of "rogue's gilliflower" applied to it has no base meaning being derived from the French *rouge* which means simply red, a color, by the way, which few Cruciferae favor.

It would be difficult to say which is the true mustard genus. Perhaps *Brassica* may claim the honor with the "white mustard" (*B. alba*), the "black mustard" (*B. nigra*), the "wild mustard" (*B. arvensis*) and the "Indian mustard" (*B. juncea*). Of these, all but the last are known as "charlock," a word with numerous spellings of which chadlock, kerlock, cadlock, curlock and skedlock may be noted. *B. arvensis* is also named "corn mustard" for its habit of growing in grain fields and "yellow flower" for its color. Its name of "kraut-grass," corrupted to "crowd-grass" refers to its use as a pot-herb and "runch-weed" or "crunch-weed" may also indicate edible qualities. This plant is also the "field kale" or "corn kale" names derived from "cole" and ultimately from the Latin *caulum* a stalk. *Brassica campestris* is the "rutabaga," *B. napus* is the "rape," *B. rapa* the "turnip" and *B. oleracea* the "cabbage," the latter from the French *cabouche*, a head. A second "black mustard" or "wild mustard" is *Raphanus raphanistrum*, but this is more commonly known as "wild radish." This plant is another "charlock," "kraut-weed" and "wild rape." Among other mustards may be mentioned the "tansy mustard" (*Sisymbrium canescens*) so called from its tansy-like leaves, the "tumble mustard" (*Sisymbrium altissimum*) also known as "Jim Hill mustard" from its

appearance along the railroad promoted by the person named, the "ball mustard" (*Neslia paniculata*), the hare's-ear mustard" (*Coringia orientalis*) and the "treacle mustard," or "garlic mustard" (*Alliaria officinalis*.) This latter is also known as "garlic-root," "poor man's mustard," and "hedge garlic." Among the ancient names are "Jack-by-the-hedge" and "sauce-alone." The word "garlic" here employed, like the technical name, refers to the onion-like odor. *Sisymbrium Sophia* is known as "Herb-Sophia," "flax-weed" and "flix-weed," the last two given this species and several others for a fancied resemblance to the flax (*Linum*.) *Sisymbrium Thalianum* though a mustard, reverts to cress nomenclature and is the "wall-cress," "mouse-ear cress" and "Thale cress." The last name is derived from Johann Thal an obscure botanist but why it is applied to this plant we do not know. The name of "turkey-pod" is equally unintelligible.

The true "Mithridate mustard" is assumed to be *Thlaspi arvensis*, though other plants have been given the name and the term "treacle-wort" applied to it seems to confirm the assumption. The word "mithridate" alludes to an old idea that Mithridates VI, king of Pontus, made himself immune to poisons by taking them in small doses and then increasing the amount until such substances had no effect on him. In medicine a mithridate is a substance that will counteract poisons but our plant has no virtues of this kind. Additional names are "dish mustard," "field penny-cress," "bastard cress," "French-weed" and "fanweed." "Penny-cress" appears to refer to the round seed-pods and "fanweed" may be derived from the same source. How the name of "French-weed" came to be applied is a mystery to me. No doubt it has an interesting history if we could fathom it. In these pages Prof. Nelson has recently noted that in our Northwest

the plant is known as "Jim Hill weed" because introduced along the railroad sponsored by Hill.

After so much mustard, rocket and cress, it is a relief to turn to names showing more originality of application. We may start with "sweet alyssum" which owes the last part of its name to the fact that until recently it was known as *Alyssum maritima*. Now the generic name is known to the scientists as *Lobularia*, but the common name continues to be alyssum. "Sweet Allison" is a corruption of the name just given while "snowdrift" alludes to the abundant, though small, white flowers. The plant's most ancient name is "madwort," given from a belief that it was a cure for the bite of a mad dog. *Alyssum alyssoides* is also known as "heal-bite" and "heal dog." Still another "madwort" is *Alyssum saxatile*. This latter is also called "rock alyssum," a name suggested by its specific name, or perhaps both derived from the plant's preference for rocks. A garden name for this species is "gold dust." It may be added in passing that none of the plants mentioned as madworts are of the slightest use against hydrophobia; indeed it is quite likely that none of them is the original madwort.

Another European crucifer with wholly imaginary medicinal virtues is the little "whitlow grass" (*Draba verna*.) It derives its common name, as well as that of "nailwort," from an ancient belief that it would cure the form of felon known as "whitlow" which usually involves the finger-nail. "Whitblow," in spite of the fact that the flowers are white, is undoubtedly a corruption of "whitlow," while "shad-blow" is due simply to an interchange of names through ignorance, of which the folk-lore of plants affords so many instances. The name "shad-blow" belongs to *Amelanchier* of the Rosaceae. *Draba stylaris* is also called "nailwort" as well as "hunger-

flower." The last name is inexplicable unless it refers to the poor soil in which the plant grows. Here we may also record that *Subularia aquatica* is called "awlwort," on account of its slender leaves, and *Lesquerella spathulata* is known as "bladder-pod" from its round inflated capsules.

A little plant not unlike draba, is the shepherd's purse" (*Caspella bursa-pastoris*) whose common name is a direct translation of the technical one. The heart-shaped seed-vessels suggest the idea of a purse or bag which appears in several of its other common names such as "shepherd's bag," "shepherd's pouch," "lady's-purse," "witches' pouches," "case-weed," and "mother's heart." Related terms are "pick-purse" and "pickpocket." "Shovel-weed" also alludes to the shape of the pods while "pepper-plant" "pepper-weed" and "hen pepper" are due to confusion of this plant with species of *Lepidium*. The names of "toothwort," "toy-wort," and "St. James' wort" seem to be without significance in the present instance.

Though the shepherd's purse may, on occasion, bear the name of "toothwort," the name seems properly to belong to the species of *Dentaria*. The name is derived from the projections on the rootstock of some species. *Dentaria diphylla* is probably best entitled to the name, but "crinkle root," in allusion to the crinkly rootstock, is the one commonly used. Among the inattentive this becomes "trinkle root." "Pepper root" alludes to its pungent properties. It is well known to children who dig up the crisp, white underground parts and eat them. *Dentaria lacinata* besides being known as "toothwort" and "pepper-root," is also called "crowfoot" and "crow-toes." It is probable that the last two names refer to the small white tubers clustered at the base of the main stem.

An interesting crucifer occasionally found in old gardens

is the "honesty" (*Lunaria annua*.) It is said to derive its name from the fact that the seeds may be seen through the thin walls of the capsule. It is also known as "money-plant" and "penny-flower" in allusion to the large flat circular seed-pods. In the garden it is called "satin pod" and "satin flower" and the smooth and shining partitions of the capsule gathered for winter bouquets, after the rest of the pod has fallen. The name of "matrimony plant" applied to this species is a puzzle unless it too alludes to the round seed-pods—matrimony ever being greatly dependent on money. It is likely, however, that "matrimony plant" is a corruption of "money-plant." *Lunaria rediviva* is called "satin flower" "satin pod" and "perennial satin flower." It is in reference to these two species that the botanist, Asa Gray, is said to have perpetrated a bit of sly humor in his "Field, Forest and Garden Botany." After the first he writes "common honesty, not native to the country but cultivated in old fashioned places" and after the second, "perennial honesty, a much rarer sort, seldom met with here."

HOLLY AND MISTLETOE

HOLLY and mistletoe are regarded as symbolic of the Christmas spirit. The holiday season does not seem to have been properly observed unless there is at least one spray of holly flaunting its red berries from some prominent position in the house, or a sprig of mistletoe so placed as to catch unsuspecting folk.

Horticulturists will tell you that holly belongs to the genus *Ilex*; that there are over four hundred species, some of which

grow into dense bushes and others into trees of more than moderate dimensions; that the species is found plentifully in Europe and that it grows abundantly along the Atlantic coast of the United States. The bright red berries and glossy green leaves, which vary greatly even on the same tree, are familiar to all, but the blossoms, white or creamy in color, appearing in May, are not so well known. All through the winter the berries, which ripen in September, hang on the branches. The timber of the holly tree is very white and tough and hard and is used to some extent commercially.

Mistletoe is a parasitic evergreen living on deciduous trees as far north as New Jersey and Indiana and as far south as Florida and Texas. *Phoradendron*, is the Greek name for the American species of mistletoe and this "tree thief" may be found living on apple tree, thorn tree, maple, poplar, locust and linden, but rarely on the oak. The mistletoe of the Old World is *Viscum album*, and so plentiful is it in some parts of England as to give an orchard a blooming appearance even in the snows of winter. Our American variety is called a false mistletoe, but it has inherited all the store of traditions and legends gathered around the European mistletoe.

The association of holly and mistletoe with Christmas may be traced far back to the days when there was no Christmas and the pagan "festival of the sun", or Yuletide, was celebrated. Yuletide, the turning of the sun in its winter solstice, was celebrated as far back as 2000 B. C. by the fire-worshippers of Persia and India. They are known to have venerated the holly and to have used it in their rites. They believed that the holly tree cast no shadow and that it was highly efficacious to sprinkle the face of a newly born child with water impregnated with holly bark. According to tradition this was the bush in which Jehovah appeared to Moses.

It was in the days of the Druids, however, that we find the holly and mistletoe treated with peculiar veneration and credited with supernatural powers. They attached special significance to mistletoe, particularly, when it was discovered growing on an oak tree. When such a growth was found it was gathered by the priests who, ceremoniously clad in robes of white, employed all the rites essential to so solemn an occasion. For the ceremony a golden sickle was used—a sickle which was never used for any other purpose. This highly-prized mistletoe was sent to various important families with appropriate Yuletide greetings. The recipients of this token of appreciation were expected to reciprocate with timely and generous contributions.

It is interesting to find that holly was used in the Saturnalia of the Romans which was celebrated in December when the sun began its upward course, and corresponded to Yuletide. When the Christians began to celebrate the birthday of Christ it is said that they too used holly in order that they might not appear conspicuous among the Saturnarians. With the spread of Christianity and the identification of the day of the birth of Christ as the twenty-fifth day of December, a date coincidental with Yuletide, the celebration of the birthday of the sun was gradually resolved into the Christmas festivities. In the process much of the ceremony and tradition attendant upon the pagan festival was quietly transferred to the Christian observation of the day.

Holly has been the subject of much superstition and legend. Pliny says that holly planted about a home serves as a charm and keeps away all ill spells, and also guards against any misdirected bolts of lightning. It was popularly believed in the middle ages that witches used holly in the manufacture of their midnight spells and incantations. Berries from holly

and juniper and mistletoe were employed to form a witch's chain, each link being finished with an acorn. In those times, and even to this day in some parts of rural England, it was considered unlucky to bring holly into the house before Christmas eve. It was also considered very unlucky not to have the holly taken down before Candlemas eve. The maids about the house who were so careless as to forget this task were certain to be terrified by mischievous sprites and unsightly hobgoblins.

Mistletoe was long supposed to have magic power. Certainly the withered spinster who found herself bussed beneath its white berries must have believed devoutly in its magic—a magic rite which has been passed down through the centuries. According to the old Norse legend, it was a spear tipped with mistletoe that was used to kill Balder, the sun god. It had been sworn that nothing "that springs from fire, air, earth or water" should hurt this celestial favorite. So the wicked and ingenious Loki, hating this Appollo of the North, made an arrow of mistletoe which he gave to blind Hoder to test. the god of darkness shot the arow and killed Balder. At the urgent pleading of all the gods and goddesses Balder was soon restored to life, and mistletoe was thereafter given into the keeping of the goddess of Love to prove that its berries were the emblem of love and not death.

From such a background of beneficence it was not unnatural later to find mistletoe considered a sovereign remedy for all diseases. It was employed for epilepsy and convulsions. Holly was also believed to have great medicinal powers, although there may be found no authentic record of any remarkable cures it effected. It is not employed in modern times, unless the good cheer it brings be considered medicine.—*Mary M. French, in Farm and Garden.*



NOTE *and* COMMENT



BIDENS TRICHOSPERMA.—The tickseed sunflower (*Bidens trichosperma*) belongs to that despised race known collectively as beggar-lice, beggar-ticks, pitchforks, cuckles and stick-tights, but by reason of its floriferousness, it rather lifts itself out of its class. In parts of Illinois, notably near the head of Lake Michigan, it fairly takes the landscape in late August and becomes the most abundant and most conspicuous of flowers. It grows in dense masses over wide areas and at the height of its season, no desert golden with rabbit-brush, no meadow taken by buttercups or rudbeckias, and no field of goldenrods can compare with it. It is the apotheosis of yellow! The range of this species is given as swamps near the coast from Massachusetts to Virginia with a second area from New York to Illinois and Kentucky in which it is found. No reason has been given for this curious distribution and some small difference in the fruits indicate that the western plant may possibly be regarded as a variety.

THE MANZANITA.—The beautiful shrub found in the mountains of California and Arizona and known as the manzanita is worthy of more extensive cultivation. The name means "little apple" as the small fruits that follow the bloom resemble the apple in color and taste. The shrubs may be recognized by their brownish-red trunks and branches. The flowers are a delicate waxy pink with red stems and are very fragrant. The wood, though small and twisted makes a wonderful stove-wood. It throws out an intense heat and leaves no soot.—*Mrs. O. A. Budd.*

NECTARIES OF TOAD LILY.—The toad lily (*Tricyrtis hirta*) which seldom blooms in the Northern States until after the first frosts have appeared, is a most interesting flower. Its three styles are surmounted by bifid stigmas which radiate from the center like the spokes of a wheel and leave six openings which are filled by the anthers of the six stamens. Nectar is secreted by the three outer members of the perianth—really the sepals—each of which has a rounded hollow at base in which are two nectar pits. Both petals and sepals are white but so thickly dotted with purple as to have a purplish effect. At the entrance to each nectary, however, the purple stops abruptly and is replaced by a pair of small orange-colored nectar guides. The petals lack nectaries but the appearance of the nectar guides upon them indicate, perhaps, that they secrete a small amount of nectar, also. Various kinds of bees frequent the blossoms but in northern latitudes the frost is almost certain to kill the aerial parts of the plant before the seeds ripen. The toad lily is not found in every dealer's catalog, but it is an attractive little plant and well worth adding to the garden. It is the very latest of the monocots to bloom if we except the autumn crocuses which really ought to wait till spring. An illustrated account of our species appears in this magazine for October, 1920.

SYMBIOSIS IN THE RUBIACEAE.—The legumes have long enjoyed the distinction of bearing nodules on their roots in which live multitudes of bacteria capable of fixing atmospheric nitrogen in a form available for higher plants. This enables the legumes to live in soils in which other plants, lacking the friendly bacteria, would find existence difficult. Anybody who will dig up the nearest plant of clover or alfalfa may see these nodules for himself. It has been known for some time that certain members of the Rubiaceae also

possess bacterial nodules, but the knowledge has not been very widely disseminated. L. A. Boodle in *Kew Bulletin* points out that several Indian plants belonging to this family have wart-like structures on the upper surface of their leaves in which such nitrogen-fixing bacteria occur. The bacteria have been named *Bacterium rubiacearum* and have been found plentifully in *Pavetta Indica* and *P. angustifolia*. The bacteria cross from one generation to the next by way of the seeds in which they lie dormant until a new plant begins to grow when they gain access to its interior through the stomata. *Ardisia crispa*, one of the Myrsinaceae, is another plant reported to have nodules of this kind.

OWNERS OF COMPLETE SETS.—Set 74 of this magazine is now the property of Lawrence College, Appleton, Wis. The University of Nebraska has also completed its set by securing missing back numbers and now should stand 75th in the list of owners. This set is of interest because it was originally the subscription of the late Dr. Bessey. Mr. F. L. Green, Greenwood, Ontario, Canada, lacks No. 124 (February, 1920) to complete his set. If any reader can supply this number, we will be glad to forward it to Mr. Green. The small stock of magazines on hand makes it necessary to again advance prices. After January 1st, 1924, a set of the first 25 volumes will cost \$20.

COCKLE-BUR POISONOUS.—Each year new instances of the poisonous nature of plants usually regarded as harmless, come to light. Things have come to such a pass that even the pig has to have a chaperone to keep him out of trouble. Investigations by the United States Department of Agriculture show that young cockle-bur plants may prove poisonous to hogs, sheep and cattle. They are especially harmful to young pigs. About a pound and a half of cockle-bur to a

hundred pounds of animal is sufficient to cause poisoning. Few animals succumb to the poison, however, being easily cured by being fed milk, bacon-grease, lard or linseed oil.

GOVERNMENT PLANT IMPORTATIONS.—In the early days of this country, when seedsmen were less numerous than at present and communication more difficult, the national government undertook to distribute seeds of useful plants in the interests of a better agriculture. The progress of time has made such distribution of little value, but it has been long persisted in, possibly because our legislators assumed that the receipt of a few packages of garden seeds each spring, would serve as a gentle reminder to the voter that his Congressman was on the job. In recent years another distribution of seeds and plants has been instituted by the Government which appears to be of the highest usefulness. The plants that figure in this distribution come from the ends of the earth, sent in by botanical explorers, botanical gardens, experiment stations and private individuals interested in advancing horticulture. The number of different species thus distributed is now more than fifty thousand! As may be inferred such specimens are sent out to those only who have adequate means of testing them and a disposition to make careful records of their behavior under cultivation. The only criticism of the distribution that can be made is that the majority of the plants are such as thrive only in the warmer parts of the world. What is needed is a special hunt for plants that will thrive in regions less favored by nature such as cold or arid regions.

ORIGINS INDICATED BY PLANT NAMES.—It is well known that most of our tree fruits come to us from southern Europe and the region surrounding the Mediterranean, and accordingly we find their names derived from the Greek and Latin languages. Such are the peach, the pear, the apricot,

the nectarine, the damson, the plum, and the prune. These are anglicised forms of the old Greek and Latin names that have reached us after passing through some Romance tongue—French, Italian or Spanish. There is, I think, but one exception to this rule. The word, apple, is of the Teutonic stock and accordingly we find that the apple is the only tree fruit of any importance that is indigenous to the northern part of Europe. The same is true of forest trees. The oak, holm oak, ash, beech, hornbeam, yew, hawthorn, holly, aspen, maple, lime, alder and elder all have Teutonic names, indicating that they grew in northern countries in ancient times. The names of the cypress, elm, chestnut, poplar, fig, myrtle, box, sycamore, pine and larch are words of southern origin, showing that these trees came from the south. This principle runs through the whole list of plant names and therefore to know the region from which the name of any plant came, affords a fair presumption of the region where it is indigenous.—*T. S. Lindsay in "Plant Names."*

AMPHICHROMY IN FOUR-O'CLOCK.—There are many species of plants which, under the hand of the plant breeder, produce flowers of different colors but cases of amphichromy, in which a single plant produces flowers of more than one color, are extremely rare. An interesting case of this latter kind has appeared in the writer's garden in which a specimen of four o'clock (*Mirabilis jalapa*) which originally produced pale pink flowers has developed more versatility and now produces red flowers, also, on some branches. As to the pink flowers, it may be said that a close inspection shows the pink to be due to a great number of tiny half-obscured red dots. One might almost conclude that the pink form is on the way to becoming a red one. The four o'clock produces a great variety of color-forms ranging from white and yellow to deep

red and has been greatly mixed by crossing. In experiments with this plant it has been found that when two pale forms are crossed, a red-flowered form is produced. This is explained by the theory that one plant has the material for making red flowers and the other has the determiner that causes the color to develop. In the plant under discussion it may be that the pale form is developing its own determiner. Its subsequent career will be watched with interest. The specimen mentioned is nine years old, at present, and has had an interesting history. One year it was overlooked entirely and did not get back into the ground for eighteen months. During this time it had neither water nor soil. This might warrant one in suggesting that though it has been alive nine years it might with some reason lay claim to being only eight years old. The past summer it produced more than ten thousand flowers!

THE LARGEST.—It is human nature to delight in mere size. At the country fair the prizes usually go to the largest and we commonly speak of the size of our home town before dilating on its intelligent citizenry. The largest plants and plant parts, therefore naturally are of interest. The largest flower in the world is the *Rafflesia*, some specimens of which measure more than a yard across. The largest flower-stalk is said to be that of *Furcroya gigantea* from which Mauritius hemp is obtained. It often reaches forty feet or more in height. Credit for the largest inflorescence probably belongs to this plant also, unless some species of *Agave* can muster more flowers to a stalk. The largest leaf is that of *Victoria regia*, the giant water lily of the Amazon, which often measures twelve feet across. The largest seed is the double coconut which weighs thirty pounds or more, but the largest fruit is undoubtedly the prize pumpkin, cynosure of everybody at the country fair. The largest herb is the banana and the

largest tree the redwood. The latter also has the thickest bark—18 inches or more in some cases. Which vine is the largest will have to be left to somebody more familiar with tropical botany than the writer. If anybody knows of larger specimens than here mentioned, we would be glad to hear from him.

LONICERA TATARICA SPECIOSA.—One of the commonest species of honeysuckle in out-of-the-way places is *Lonicera tatarica*. It seems to have been a favorite with the old settlers and vies with the common lilac for a place in the old-fashioned garden. In spring when covered with its rather small, pale pink flowers, it is fairly attractive and is still often planted in parks and large estates. The ordinary form, however, is so greatly inferior to other forms of the same species that one wonders how the original ever gets planted nowadays. The most attractive form has deep pink flowers nearly an inch across and borne in great profusion. When in flower it does not suffer in comparison with the red-bud, wild crab or any other shrub of its genus. In the dealers' catalogues, the pink form is called the variety *grandiflora*, *grandiflora rubra*, *splendens* and *pulcherrima*. It is quite likely that each name may stand for a slight difference in form, for the species is quite variable. One should see the shrub in bloom to make sure of getting the best.

ASTER LAEVIS.—Late in September in the Northern States, the asters begin to command attention by reason of their abundance, variety, and striking range of colors. One who examines a field of these plants soon discovers that several species commonly grow together though their color variations often give the impression that there are more species present than is the case. The New England aster is nearly always accompanied by a clear rose-colored form much hand-

somer than the type and an albino form is not difficult to find. The most beautiful of all the aster species in the Middle West, however, is *Aster laevis* whose large, deep violet-colored flower heads, borne in profusion are fully the equal of any plant cultivated in the flower garden at the same season. Why this plant is not oftener given a place beside the chrysanthemums is a puzzle. The plants seem fond of the waste land along the railroads and would make traveling by rail a continual delight for some weeks in autumn were it not for the fact that thoughtful railroad officials, impressed with the beauty of bare cinders, send out a few laborers with scythes, just as the blooming season opens, to lay the plants low. Here and there, however, enough plants escape to provide the flower lover with the materials for a planting that will eclipse both the late garden asters and the early chrysanthemums.

FRINGED GENTIANS.—Most people speak of the fringed gentian as if there was but one species of the kind in the world. No doubt this is due to the influence of Bryant's poem on the subject, but it may be well to note that there is another species, *Gentiana procera*, found from New York to Iowa and northward into Canada. *Gentiana crinita*, however, is best entitled to the adjective "fringed" for the tips of its petals are cut into fine segments of some length, while those of *G. procera* are merely ciliate on the edges. In other respects the two species are much alike and the inexperienced might easily collect *procera* with the idea that he had found its more famous relative. Westward the two species have practically the same range but on the east, *crinita* pushes up into Maine and south to Georgia.

QUACK GRASS.—The farmer or gardener who does not know quack-grass (*Agropyrum repens*) is to be congratulated. It easily excels the Canada thistle in general pestiferousness

and is regarded by the Government as "the most notorious of all weeds and one that causes greater monetary loss than any other single species." It comes originally from Europe but is now quite at home in America having spread widely in the Northern States but with, as yet, no disposition to invade the South. It is an active agent in the spread of the red rust of wheat but its eradication has none of the spectacular features connected with it that are attached to the pursuit of the common barberry and it therefore appears to be immune from the attacks of the young college graduate. Legislators may legislate against the thistle but they know better than to go after the quack-grass. The latter simply defies the farmer, the barberry eradicator and everybody else. It will grow in any kind of soil, and spreads rapidly by slender under-ground runners. When once established it is next to impossible to eradicate. Plowing only serves to scatter the runners and spread the plant more widely. Hand weeding might in time be successful but if one relaxes his efforts for a single season, back comes the quack grass as bad as ever. Buckwheat and hemp, however, have the reputation of being able to smother it. It makes a fair grade of hay and like its close relative, wheat, its seeds may be used as human food. Flour has also been made from the underground runners, and these are said to have been so used in Bavaria during the great war. Notwithstanding the abundance of quack grass in America we annually import some 250,000 pounds of it, the supply coming mostly from Germany. From ten to twenty cents a pound is paid for it. The imported grass is used in medicine under the name of dog-grass or as the physician is fond of writing it "*radix graminis*."

PURSLANE WITH DOUBLE FLOWERS.—The common purslane or pursley (*Portulaca oleracea*) is a well-known fat little

weed that is often a pest in rich garden soil. It is a close relative of the common rose-moss or portulaca (*P. grandiflora*) commonly cultivated in cottage dooryards but nobody would look to it for evidences of beauty.—Nevertheless L. H. Bailey reports a variety of this species (*P. oleracea* var. *giganthes*) which he found in cultivation in British Guiana, with flowers more than an inch across and completely double. It may be that others may find this latter plant worth a place in the flower garden, but the associations of this plant in the writer's mind is such that it is doubtful if he could resist pulling it up before it bloomed.



EDITORIAL



Beginning in 1924, it is our intention to issue this magazine on or near the beginning of January, April, July and October, instead of nearly two months later than those dates, as at present. This brings us more into line with the practice of other quarterlies and relieves us of explaining to new subscribers, each year, that the January number is issued in late February. Those whose subscriptions expire with this issue will naturally need to renew earlier to avoid the possible loss of one or more numbers. At present we are issuing only sufficient copies to take care of subscribers and continue the sets of back numbers still on hand. Often the supply of one issue runs out before the next is printed. In this connection attention may be called again to the fact that continuous subscriptions cost less than the annual subscriptions and may be paid for during the year when most convenient. Annual subscriptions are stopped at the end of the time paid for.

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For a generation or more, the hunt for new species of plants has been pursued with astonishing intensity. It is to be feared, however, that in the excitement of describing species new to science, the species-maker has often yielded to the temptation to describe as novelties plants of very dubious standing. At one time the doctrine that any plant that differed from others in a single constant character was a good species gained wide acceptance. Botanists employed their talents in discovering differences rather than in studying such

differences to learn, if possible, whether they were of any special significance. On this basis, numerous old and familiar species were reported to be complexes from which a number of new forms could be derived. The result of such activities on the science of botany was to obscure what before was reasonably clear and to add to the perplexities of the beginning student who was too often lost in a maze of species which seemed all pretty much alike. For some time thoughtful students have felt that a re-examination of the evidence upon which such species were founded would be desirable, but the first tangible results of investigations in this direction have only recently appeared. Now the published results of such an inquiry into the species of *Atriplex*, *Chrysanthemus* and *Artemisia* by Frederic E. Clements and Dr. Harvey E. Hall seem to prove the desirability of similar studies in other genera. These investigators set out to examine, one by one, the characters relied upon to distinguish species in the genera mentioned with a view to deciding what are and what are not of diagnostic importance and thus establish a scientific basis for classification. Unlike other students they did not rely solely upon herbarium material but studied the plants in the field from Mexico to Canada and also made numerous experiments with the plants under cultivation. Collectors of herbarium specimens are noted for selecting the more striking plants and in consequence such specimens are quite misleading and not representative of the form as a whole. In the study referred to it was found that many plants described as good species were mere freaks or founded on characters that vary greatly in all the species. The old way of making a species was to label it new if it looked different; the new way endeavors to examine the differences to see if they are stable and of specific importance. In a survey as comprehensive as this it

definitely related to the soil and climate of their habitat is shown, the fact that such societies may succeed one another in a given area is demonstrated, and the methods of studying the phenomena connected with the subject is carefully indicated. Incidentally one gleans from the book a clear impression of the differences between British and American vegetation which inhabit similar areas. The study of ecology is certain to become more popular as it becomes more familiar and those who are inclined to investigate the subject would do well to see this book. It is published by Dodd, Mead and Co., New York.

We all of us love trifles at heart; the shapes and aspects of things, the quality of sounds, the savors of food, the sweet and pungent odors of earth. We persuade ourselves, as life goes on, that these things are unimportant, and we dull our observation of them by disuse; but in all the essayists that I can think of, this elemental perception of things as they are is very strong and acute; and half their charm is that they recall to us things that we have forgotten; things which fell sharply and clearly on the perception of our younger senses, or bring back to us in a flash that delicate wonder, that undimmed delight, when the dawn lay brightening about us and when our limbs were restless and alert.—A. C. BENSON.